

Impact of covid 19 on energy consumption in Baltic countries

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Link to repository:

<https://github.com/ArturKreegipuu/covid19-impact-on-energy-consumption-in-Baltics.git>

Task 2. Business understanding (0.5 point)

Identifying your business goals

Background:

The COVID-19 pandemic has brought unprecedented changes to societal behaviors and activities, impacting various sectors, including energy consumption. Our project focuses on understanding how measures implemented during the pandemic, such as lockdowns and closures, have influenced energy consumption in the Baltic countries. The Baltic countries under consideration are Estonia, Latvia and Lithuania. We aim to provide insights into the dynamics of energy consumption before, during and after the pandemic, contributing valuable information for policy-makers, energy planners, and researchers.

Business goals:

- **Quantify impact:** Assess the quantitative impact of COVID-19 measures (lockdowns, closures) on energy consumption in Baltic countries.
- **Identify influencing factors:** Investigate and identify the factors that significantly influenced changes in energy consumption during the pandemic.
- **Inform policy decisions:** Provide actionable insights to policymakers and energy authorities based on the observed patterns in energy consumption.

Business success criteria:

- Achieve a clear understanding of the correlation between COVID-19 measures and energy consumption.
- Identify key influencing factors contributing to changes in energy consumption patterns.
- Generate informative visualizations and reports for effective communication of findings.

Assessing your situation

Inventory of resources:

- Three CSV files containing hourly energy consumption data for each Baltic country from 01.01.2018 to 31.12.2022.
- Data science and analytics tools (Python, Jupyter Notebooks, Pandas, etc.).
- Domain expertise in energy consumption and statistical analysis.

Requirements, assumptions, and constraints:

- Access to reliable and up-to-date COVID-19 measurement data for the Baltic countries.
- Assumption: Energy consumption data is representative and accurately reflects the overall energy usage in each country.
- Constraint: Limited historical data beyond 2022.

Risks and contingencies:

- Risk: Incomplete or inaccurate COVID-19 data.
- Contingency: Validate and cross-reference COVID-19 data from multiple sources.

Terminology:

- Energy consumption - total amount of energy utilized within a specific system, region, or entity during a given period.
- Covid-19 - highly contagious respiratory illness caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)

Costs and benefits:

- Costs: Computational resources, and potential additional data sources. Costs are probably around 0€ for our project
- Benefits: Informed decision-making for policymakers, enhanced understanding of energy dynamics during crises.

Benefits exceed the costs.

Defining your data-mining goals

Data-mining goals:

- Identify patterns and trends in energy consumption during the COVID-19 pandemic.
- Explore correlations between energy consumption and external factors (GDP, travel restrictions, temperature).

Data-mining success criteria:

- Uncover actionable insights regarding the influence of external factors on energy consumption.
- Provide a comprehensive report with visualizations for effective communication of findings.

In conclusion, our project aims to provide valuable insights into the impact of COVID-19 on energy consumption in Baltic countries. By identifying patterns and influencing factors, we intend to contribute to informed decision-making in the energy sector and help shape future energy policies.

Task 3. Data understanding (1 points)

Gathering data

Outline data requirements:

Our project requires hourly energy consumption data for the Baltic countries (Estonia, Latvia, and Lithuania) from 01.01.2018 to 31.12.2022. The data should also include some information on COVID-19 measures such as lockdowns, school closures, and other relevant restrictions. Additionally, we need external factors like GDP, travel restrictions, and temperature for a comprehensive analysis.

Verify data availability:

We have obtained three CSV files, each corresponding to one Baltic country, containing hourly energy consumption data. These files cover the specified timeframe from 2018 to 2022. The COVID-19 data will be sourced from reliable news sources, and additional datasets for GDP, travel restrictions, and temperature will be collected from reputable sources.

Latvian weather data:

https://data.stat.gov.lv/pxweb/en/OSP_OD/OSP_OD_vide_geogr_geogr/GZ010m.px/?fbclid=IwAR2uXzS2sQy4FtXCkPQwYjBjRXu2xIULogPoKCJDD3gzWbSJDZ1wxZpbE3A

Estonian weather data:

https%3A%2F%2Fwww.ilmateenistus.ee%2Fkliima%2Fajaloolised-ilmaandmed%2F&h=AT1GdUV3avWiTDt9BmSKGEZMg18sjo4gACnJlyDkg3UI88vilCGhM-YY6y9Q1wyRrRotSbaBSXAIG3hVA5mJSsEftsLJquTmMEqzRVF5sZjAOWOEyyyJG_6yAPANKuEeuULo9hky3xo

Lithuanian weather data:

https://data.humdata.org/dataset/world-bank-climate-change-indicators-for-lithuania?force_layo ut=desktop&fbclid=IwAR0iC4UvTLjrw3awxMkb2HXkMXR-AQ7CXID2uW8eWN1StcjSjmEbASVgnlc

Estonian GDP growth: <https://tradingeconomics.com/estonia/gdp-growth>

Latvian GDP growth: <https://tradingeconomics.com/latvia/gdp-growth>

Lithuanian GDP growth: <https://tradingeconomics.com/lithuania/gdp-growth>

Estonian Covid-19 cases: <https://tradingeconomics.com/estonia/coronavirus-cases>

Latvian Covid-19 cases: <https://tradingeconomics.com/latvia/coronavirus-cases>

Lithuanian Covid-19 cases: <https://tradingeconomics.com/lithuania/coronavirus-cases>

Define selection criteria:

To ensure data relevance, we have set the selection criteria as follows:

- Energy consumption data must be complete with minimal missing values.
- COVID-19 data should include details on the intensity and duration of various measures.
- External factors data must align with the timeframes of interest.

Describing data**Exploring data:**

The energy consumption datasets about each Baltic country consist of hourly records, providing a granular view of usage patterns over time. Key variables include:

Timestamp: Hourly intervals from 01.01.2018 to 31.12.2022.

Energy Consumption: Measured in megawatt-hours (MWh).

Verifying data quality:

To ensure the reliability of our analysis, we conducted an initial assessment of data quality:

- Checked for missing values in energy consumption records, finding minimal gaps.

Results

Our exploration revealed that the energy consumption data has some missing values, which will have to be processed. Some datasets have a few missing rows. After filling these rows we can conduct detailed analysis at an hourly level.

Next steps

- Data cleaning: Address missing values in the energy consumption dataset to ensure completeness.

Task 4. Planning your project (0.25 points)