OpenSTEF Roadmap

Roadmap 2024

Vision

Our open-source initiative aims to develop a cutting-edge machine learning pipelines for short-term energy load forecasting on the grid. These pipelines are designed for seamless adoption, boasting exceptional quality and harnessing built-in expert knowledge. The aim is to make OpenSTEF the industry standard for short term energy forecasting.

Fostering an active community, our project encourages collaborative efforts, fostering continuous improvement of the code base through contributions from multiple stakeholders.

Unique selling points

- Easy adoptability
  - Automated pipelines make it very easy to train a model and make a forecast
  - The example notebooks provide an easy way to get familiar with the model
- Simple interface
  - Extendable
  - Explainable
- Proven/benchmarked high forecasting quality
  - Easily benchmarked by backtest
  - Implemented at companies such as Alliander and RTE
- Build-in expert knowledge on energy systems
  - Close connection to academic knowledge (latest scientific innovation)
  - Feature engineering
  - Energy splitting
- Fully open-source
  - Community of experts
- Flexibility to be able to implement in any enterprise environment
- Scalability
- Data standard on how to handle forecast (standardization)

Plans community

**Alliander - KTP team**

- Improve forecast quality
- Dagster
  - MLOPs architecture
    - May influence the reference implementation
    - Add maybe second reference implementation
    - Larger scale implementation
    - Add to description
- Improved DAZLs model (Q1)
- Update example notebooks

**Firan**

- Improve forecasting quality of peaks, with a very short time horizon

**RTE**

- Predict wind power on OpenSTEF.
  - Predict every hour for 72 hours.
  - 2500 windfarms.
- Implement new machine learning model

**RTE-i**

- Create a complete POC for demonstration purposes (Q1/Q2)
- Present a webinar on OpenSTEF (22nd of March, Q1)

**Sigholm**
• Deploy OpenSTEF on Sigholm cloud environment
• If requirements are met, switch to OpenSTEF as main forecasting tool.
• Demo to Sigholm customers
• Integrate with other Sigholm products.

Shell
• Implementation OpenSTEF-dbc realtime

Planned milestones

<table>
<thead>
<tr>
<th>Year</th>
<th>Q</th>
<th>Milestone</th>
<th>Company</th>
<th>Kind</th>
</tr>
</thead>
<tbody>
<tr>
<td>2024</td>
<td>1</td>
<td>Promote OpenSTEF at FOSDEM</td>
<td>Alliander</td>
<td>Outreach</td>
</tr>
<tr>
<td>2024</td>
<td>1</td>
<td>OpenSTEF workshop</td>
<td>Alliander</td>
<td>Outreach</td>
</tr>
<tr>
<td>2024</td>
<td>1</td>
<td>Present webinar on OpenSTEF</td>
<td>RTE-i</td>
<td>Outreach</td>
</tr>
<tr>
<td>2024</td>
<td>1/2</td>
<td>Complete POC for demonstration purposes</td>
<td>RTE-i</td>
<td>New</td>
</tr>
<tr>
<td>2024</td>
<td>1/2</td>
<td>Improve forecasting quality</td>
<td>Alliander</td>
<td>Improvement</td>
</tr>
<tr>
<td>2024</td>
<td>2</td>
<td>Provide benchmark of OpenSTEF on relevant usecase compared to other forecasting providers</td>
<td>New</td>
<td></td>
</tr>
<tr>
<td>2024</td>
<td>2</td>
<td>Promote OpenSTEF at CIRED (incl. Methodology paper)</td>
<td>Alliander</td>
<td>Outreach</td>
</tr>
<tr>
<td>2024</td>
<td>3</td>
<td>LF energy summit</td>
<td></td>
<td>Outreach</td>
</tr>
</tbody>
</table>

Previous roadmaps

Input Alliander:

Forecasting topics at Alliander 2022:
• Scale up 'Contingencies': locations with active capacity management
• T-prognoses customers; including those in our load/generation forecasts
• Forecasting load at non-measured secondary substations
• Forecasting Reactive power (with few measurements)

Milestones related directly to OpenSTEF: (version 2022-02-21):

<table>
<thead>
<tr>
<th>Year</th>
<th>Q</th>
<th>Milestone</th>
<th>Kind</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>1</td>
<td>Finish OpenSTEF LFE Intake</td>
<td>Outreach</td>
</tr>
<tr>
<td>2022</td>
<td>1</td>
<td>Remove Openstef-dbc from Openstef</td>
<td>Improvement</td>
</tr>
<tr>
<td>2022</td>
<td>2</td>
<td>Forecasting API - together with SOGNO</td>
<td>New</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FastAPI wrapper around OpenSTEF</td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>2/3</td>
<td>Promote OpenSTEF @ LFE</td>
<td>Outreach</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• project interview video</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• host webinar</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• promote at conference blocked URL</td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>3</td>
<td>Backtest / Predictability Analyses</td>
<td>New</td>
</tr>
<tr>
<td>2022</td>
<td>3</td>
<td>Ensemble forecasts - Automated optimized combination of independent forecasts / forecasting algorithms</td>
<td>Improvement</td>
</tr>
</tbody>
</table>

Input RTE:
Short Term Forecasts

RoadMap 2022-2024

Wind

- Balancing specific forecasts (ID to D+13) using multiple weather forecasts providers and machine learning algorithms
- Spatio-temporal very short term local forecasts (H to H+6)
- Dynamical multi-providers short term local forecasts

Solar

- Satellite images local-based nowcasting
- Extrapolated satellite images based (Cloud Motion Vector) very short term local forecasts (H to H+6)
- Short term forecast model refactoring (ML algorithm and weather products for ID to D+2)

Load

Direct Net load forecasting approach

Tools

- OpenSTEF standardisation
- Operational forecasting modules OpenSTEF migration
- Choosing a database technology