

LF Energy New Project Proposal: OpenSTF

General information

1. General information

Name of project:

OpenSTF: Short Term Forecasting, opensource

Project description (what it does, why it is valuable, origin and history)

The energy transition poses new challenges to all parties in the energy sector. For grid operators, the rise in renewable energy and electrification of energy consumption leads to the capacity of the grid to near its physical constraints. Forecasting the load on the grid in the next hours to days is essential for anticipating on local congestion and making the most of existing assets.

OpenSTF provides a complete software stack which forecasts the load on the electricity grid for the next hours to days. Given a timeseries of measured (net) load or generation, a fully automated machine learning pipeline is executed which delivers a probabilistic forecast of future load. This works for energy consumption, (renewable) generation or a combination of both. OpenSTF performs validation on the input data, combines measurements with external predictors such as weather data and market prices, trains any scikit-learn compatible machine learning model, and delivers the forecast via both an API and an (expert) graphical user interface. The stack is based on open source technology and standards and is organized in a microservice architecture optimized for cloud-deployment.

The Dutch DSO Alliander started the Short-Term-Forecasting project to anticipate congestion in the distribution grid, to allow for grid safety analysis in the transmission grid and to enable smart grid innovations to locally balance supply and demand within the constraints of the grid. By opensourcing the stack, the ambition is to provide an industry standard for generating and evaluating forecasts in the operational time-domain, as well as allow for structured collaboration.

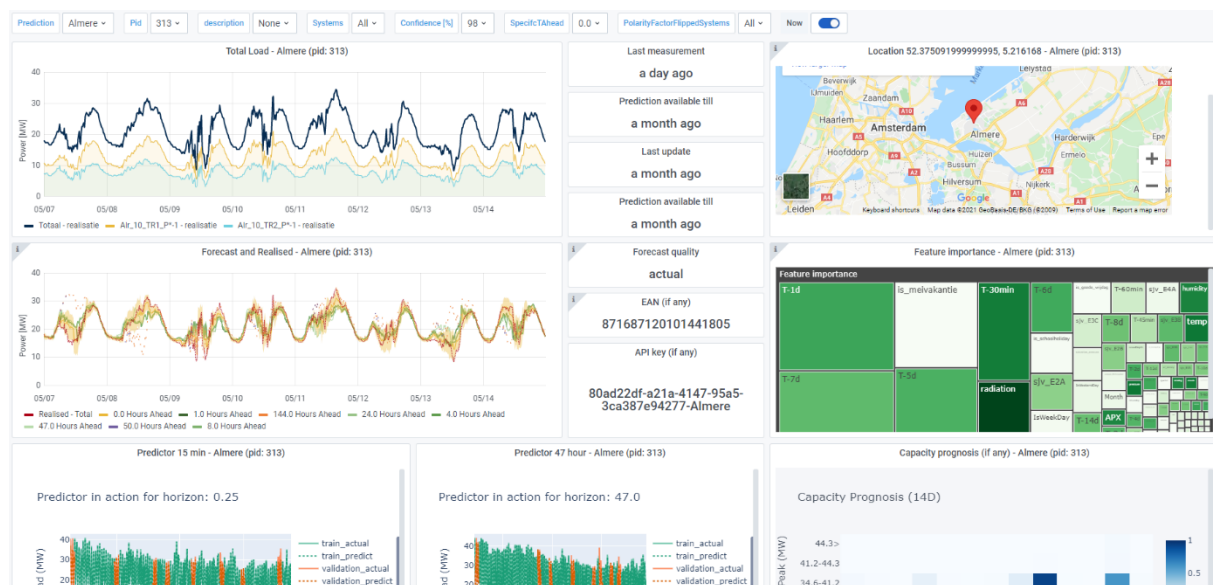


Figure 1: Screenshot of OpenSTF expert dashboard

Project lead

To be decided by the project's Technical Steering Committee. For ad interim: Frank Kreuwel

Project financial sponsor organization(s)

Alliander N.V.

Names of other key contributing individuals and organizations

RTE (the electricity transmission system operator of France)

Proposed Technical Steering Meeting (TSC) members

Initial TSC members:

- Frank Kreuwel (frank.kreuwel@alliander.com)
- Bram Harmsen (bram.harmsen@alliander.com)
- Jan Maarten van Doorn (jan.maarten.van.doorn@alliander.com)
- Jonas van den Bogaard (jonas.van.den.bogaard@alliander.com)

Frank Kreuwel will initially chair the TSC.

Existing community links:

Repository hosting

Github – Alliander/opensource:

- Calculation package: <https://github.com/alliander-opensource/openstf>
- Data connection package: <https://github.com/alliander-opensource/openstf-db-connector>
- Reference implementation: <https://github.com/alliander-opensource/openstf-reference>

Artifact hosting

Package available at <https://pypi.org/project/openstf/>

Project website and docs

Currently there are no specific project website for this project.

Basic documentation can be found in the Github Repo's. For example the documentation for the Calculation package consists of:

- Readme: <https://github.com/alliander-opensource/openstf#readme>
- How to contribute: <https://github.com/alliander-opensource/openstf/blob/main/CONTRIBUTING.md>
- Project Governance: https://github.com/alliander-opensource/openstf/blob/main/PROJECT_GOVERNANCE.md
- Code of conduct: https://github.com/alliander-opensource/openstf/blob/main/CODE_OF_CONDUCT.md

Mailing lists, slack, irc

Currently there are no specific project mailing list for this project.

Questions can be addressed to the TSC via korte.termijn.prognoses@alliander.com or the following teams channel: [Microsoft Teams Channel link](#)

Social media accounts

Currently there are no specific social media accounts for this project.

2. Open source status:

Please describe the project's license.

Mozilla Public License 2.0

Is the project's code available now?

Yes, on Github. See the 'Existing community links' section for more information.

Is the code publicly posted? On GitHub or elsewhere?

Yes, on Github. See the 'Existing community links' section for more information.

Does this project have ongoing public (or private) technical meetings?

Yes. At the moment these are private, but these can be made public

Do this project's community venues have a code of conduct? If so, what is it?

Yes, adapted from the Contributor Covenant, version 1.4: [CODE OF CONDUCT.md](#)

Describe the project's leadership team and decision-making process.

Issues and feature requests can be made by anyone on Github via Github Issues. Anyone can contribute by generating a Pull Request. The PR has to be approved by a TSC member before it is merged. TSC members decide on the roadmap and structural changes to the project. Currently these meetings are biweekly and private, but this is open for change. The TSC chair is responsible for the final decision. For more information, see the [CONTRIBUTING.md](#) & [PROJECT GOVERNANCE.md](#) in the Github Repo's

Does this project have public governance (more than just one organization)?

No

Does this project have a development schedule and/or release schedule?

The project follows CI/CD strategy with releases upon completion of features.

Does this project have dependencies on other open source projects? Which ones?

Yes, many. Dependencies of the python code are listed in the requirements.txt of the repo's. Most important dependencies:

Scikit-learn, influxdb, grafana, fastapi, pandas, docker

Describe the project's documentation.

Basic documentation can be found in the Github Repo's. See the 'Existing community links' section for more information.

Describe any trademarks associated with the project.

None

3. Project status:

Do you have a project roadmap? please attach [Are this project's roadmap and meeting minutes public posted?]

Year	Quarter	Milestone	kind
2021	Q1	MVP deployment at RTE	Onboarding
2021	Q1-2	pipeline/interface improvements	Improvement
2021	Q1-2	Datamodel and loose coupling	Improvement
2021	Q2	Standardised logging & monitoring	Improvement
2021	Q3	Health-metrics endpoint	New
2021	Q3	Input measurements validation	Improvement
2021	Q3	Forecast quality upgrade	Improvement
2021	Q3	Predictability analysis	New
2021	Q4	Administration interface	New
2021	Q4	CIM-compliant PSR configuration	New

Not yet publicly available

Does this project have a legal entity and/or registered trademarks?

No

Has this project been announced or promoted in any press?

No

Does this project compete with other open source projects or commercial products?

There is a link with ProLoaF (<https://git.rwth-aachen.de/acs/public/automation/plf>), which is the Probabilistic Load Forecast used in Sogno. OpenSTF can be considered complementary to ProLoaF, since ProLoaF provides a single, state-of-the-art machine learning algorithm and OpenSTF provides a more generic framework to generate forecasts, use different types of machine learning models interchangeably and inspect forecast results. Based on discussions with developers of ProLoaF, we anticipate that ProLoaF can be included in OpenSTF with limited effort. Also, we consider it to be likely that the API framework provided in OpenSTF can be used by or expanded upon by ProLoaF. Further investigation on integration of components are part of ongoing meetings between the OpenSTF, ProLoaF and Sogno teams.

4. Project value:

Why would this project be a good candidate for inclusion in LF Energy?

Short term forecasting is relevant for many parties in the energy sector. Currently many parties are tackling this challenge on their own with little benefit from each others efforts. OpenSTF would allow more structured collaboration and therefore to improve upon the state-of-the-art significantly faster.

Provide a statement on alignment with the mission in the [LF Energy charter](#).

This mission of the OpenSTF project is in line with the LF Energy charter; i.e. it provides an open source and/or open standards project relating to the generation, transmission, distribution and delivery of energy.

What specific need does this project address?

Forecasting the net load of the grid in the oprational time domain

Describe how this project impacts the energy industry.

Forecasting the load on the grid in the next hours to days is essential for anticipating on local congestion and making the most of existing assets, thereby enabling a fast-paced Energy Transition for low societal costs.

Describe how this project intersects with other LF Energy projects.

Link with Sogno; one of the elements of Sogno is ProLoaF (a Probabilistic Load Forecast (plf)). See 'Does this project compete with other open source project or commercial products' section for more information.

Who are the potential benefactors of this project?

Parties in the energy sector who desire a forecast of the net load; e.g. DSO's, TSO's, BRP's

What other organizations in the world should be interested in this project?

Energinet, Elia, TenneT, Enexis, Stedin, universities, and many more.

5. Project needs:

How would this project benefit from inclusion in LF Energy?

Outreach to many potential benefactors and collaborators, support in creation and maintaining open source community

Please describe any infrastructure needs or requests (e.g., web hosting).

Project website hosting (e.g. <https://www.lfenergy.org/projects/openleadr/>)

Plan for achieving next maturity level (Incubation -> Early Adoption -> Graduated).

Main focus would be to grow key contributing individuals and organizations by at least 1.