Technical Advisory Council (TAC) Meeting

2 September 2025

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Meeting information

- ➔ Meeting to begin at 5:00 pm Central European Time
- ➔ Join the meeting at the link in your calendar in LFX Individual Dashboard
- ➔ Any problems with connectivity, you can contact John Mertic from the Linux Foundation at +1 234-738-4571
- ➔ Previous TAC Meeting notes, deck, and recording, at https://wiki.lfenergy.org/display/HOME/Technical+Advisory+Council#TechnicalAdvisoryCouncil-MeetingMinutes

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Linux Foundation meetings involve participation by industry competitors, and it is the intention of the Linux Foundation to conduct all of its activities in accordance with applicable antitrust and competition laws. It is therefore extremely important that attendees adhere to meeting agendas, and be aware of, and not participate in, any activities that are prohibited under applicable US state, federal or foreign antitrust and competition laws.

Examples of types of actions that are prohibited at Linux Foundation meetings and in connection with Linux Foundation activities are described in the Linux Foundation Antitrust Policy available at linuxfoundation.org/antitrust-policy. If you have questions about these matters, please contact your company counsel, or if you are a member of the Linux Foundation, feel free to contact Andrew Updegrove of the firm of Gesmer Updegrove LLP, which provides legal counsel to the Linux Foundation.

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Agenda

All Times in Central European Time Zone

- 5:00 pm - 5:10 pm - Opening and General Updates
  - TAC member updates and annual review date reminders
  - SIG updates and meeting schedule
  - Project Pipeline
  - TAC Priorities 2025 #436
  - Project Services Funding #613
  - Project website policy #582
  - PowSyBL Security audit complete! #594
- 5:10 pm - 5:30 pm - New Project/Working Group Proposal: RTC-Tools #344
- 5:30 pm - 5:50 pm - New Project/Working Group Proposal: Power Stability Wide Area Monitoring Protection (p-SWAMP) #585
- 5:50 pm - 6:10 pm - Annual Review: Battery Data Alliance #57
- 6:10 pm - 6:30 pm - Annual Review: OperatorFabric #71
- 6:30 pm - 6:30 pm - Closing and Next Meeting

Marketing/PR/Events updates in APPENDIX

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Opening and General Updates

5:00 pm - 5:10 pm

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Technical Advisory Council (TAC)

voting representatives

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Antonello Monti

Chair

Professor

RWTH Aachen University

Art Pope

Member of Technical Staff

Google LLC

Boris DOLLEY

Director of OSPO and Sustainable IT Strategy

RTE (Reseau de Transport dElectricite)

Bryce Bartmann

Chief Digital Technology Advisor

Shell International Exploration & Production, Inc.

Clément Bouvier

Software engineer

RTE (Reseau de Transport dElectricite)

Jonas van den Bogaard

Vice Chair

Open Source Office Lead

Alliander

Maarten Mulder

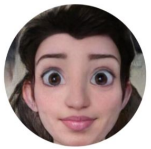
PO IoT Field Device Platforms

Alliander

Moise Kameni

Entreprise Architect and Head of Open Source Program Office

Hydro-Québec



Sophie Frasnedo

Software developer

RTE (Reseau de Transport dElectricite)

Travis Sikes

Data Science Manager

Recurve

Yixing Xu

Senior Program Manager, Energy Strategy

Microsoft Corporation

Projects

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TAC Meeting Schedule 2025

The TAC meetings are monthly, on the second Tuesday of the month at 8:00am US Pacific Time/11:00am US Eastern Time unless otherwise noted.

- ~~February 11~~
- ~~March 11~~
- ~~April 8~~
- ~~May 13~~
- ~~June 10~~
- ~~July 8~~
- ***September 2*** *(one week earlier)*
- *September 9 (joint meeting with GB - 4:00pm CET at LF Energy Summit)*
- October 14
- November 11
- December 9

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Project and Working Group Leads

Name	Chair
Arras	David Chassin
Battery Data Alliance	Gabe Hege
CitrineOS	Thana Paris
CoMPAS	Sander Jansen
Connected Data Specification - Customer Data Working Group (CDS WG3)	Daniel Roesler
Connected Data Specification - Power Systems Data Working Group (CDS WG2)	Stephen Suffian
Connected Data Specification - Registration Working Group (CDS WG1)	Daniel Roesler
covXtreme	Sachin Bhakar
CUPID (Controllable Unit Protocol Interface for DER)	
Dynaωo	Marco Chiaramello
EVerest	Marco Möller
FIDOPower	David Chassin
FledgePower	Romain Lebrun Thauront
FlexMeasures	Nicolas Höning
Grid Edge Interoperability & Security Alliance (GEISA)	Michael Stuber, Richard Lam
Grid eXchange Fabric (GXF)	Maarten Mulder
Grid Vantage	Alyona Teyber
Grid2Op	Benjamin Donnot
GridFM	François Mirallès
Hyphae	Arila Barnes
LF Energy Semantic Energy Framework (LFE-SEF)	Barry Nouwt
NODE Collective	Deandrea Salvador
OpenDSM	Travis Sikes
OpenLEADR	Arila Barnes, Stan Janssen, Hugo Van De Pol
OpenSTEF	Daan Van Es
OpenSynth	Gus Chadney
OperatorFabric	Frédéric Didier
ORES (Open Renewal Energy Systems)	Chris Xie
Power Grid Model	Peter Salemink
PowSyBL	Sophie Frasnedo
Real Time Data Ingestion Platform (RTDIP)	Bryce Bartmann
SC Decarbonisation Hub	Sachin Bhakar
SEAPATH	Eloi Bail
Shapeshifter	Robben Riksen
SOGNO	Antonello Monti
TROLIE	Christopher Atkins

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SIGs and SIG Leaders

Name	Chair
AI SIG	Alexandre Parisot
Digital Substations SIG	Jos Zenner, Maxime Pelletier
EV Charging SIG	Robert De Leeuw, Thana Paris
Grid Simulation and Modeling SIG	Thomas Van Dijk

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TAC Resources

- TAC Website - https://tac.lfenergy.org
  - Contains all the TAC policies and meeting materials, as well as guides to using the various LF Energy tools
- TAC Overview - https://github.com/lf-energy/foundation/blob/main/overview_deck/LF%20Energy%20TAC%20Overview.pdf
  - Guide for TAC members on their role and how to navigate LF Energy

Questions/feedback - let us know!

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Annual Review Schedule - TAC

Source:
https://tac.lfenergy.org/process/review_cycle.html

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Name	Last Review Date	Next Review Date
Battery Data Alliance	8/27/2024	9/2/2025
OperatorFabric	7/16/2024	9/2/2025
Grid Edge Interoperability & Security Alliance (GEISA)		10/14/2025
GridFM	10/29/2024	10/14/2025
NODE Collective	4/2/2024	10/14/2025
AI SIG	10/29/2024	11/11/2025
FlexMeasures	11/20/2024	11/11/2025
SC Decarbonisation Hub		11/11/2025
Connected Data Specification - Customer Data Working Group (CDS WG3)		12/9/2025
Connected Data Specification - Power Systems Data Working Group (CDS WG2)		12/9/2025
Connected Data Specification - Registration Working Group (CDS WG1)		12/9/2025
Digital Substations SIG		12/9/2025
TROLIE	9/6/2023	12/9/2025
EV Charging SIG		1/13/2026
Grid Simulation and Modeling SIG		1/13/2026
Grid2Op	2/11/2025	2/10/2026
Hyphae	2/11/2025	2/10/2026
LF Energy Semantic Energy Framework (LFE-SEF)	4/23/2024	3/10/2026
OpenSynth	3/11/2025	3/10/2026
ORES (Open Renewal Energy Systems)	4/8/2025	4/14/2026
Shapeshifter	4/8/2025	4/14/2026
OpenDSM	5/13/2025	5/12/2026
SOGNO	5/13/2025	5/12/2026
Grid eXchange Fabric (GXF)	7/8/2025	7/14/2026

Annual Review Schedule - SIG

SIG Leaders - please share how recent reviews have went, and let us know if the schedule/alignment is still correct - contact email support@lfenergy.org

Source: https://tac.lfenergy.org/process/review_cycle.html

Name	Last Review Date	Next Review Date	SIG
Grid Vantage	9/26/2023	6/4/2025	Grid Simulation and Modeling
Arras	7/16/2024	10/1/2025	Grid Simulation and Modeling
Dynaωo	1/30/2024	10/1/2025	Grid Simulation and Modeling
CitrineOS	11/27/2024	11/26/2025	EV Charging
SEAPATH	1/14/2025	1/13/2026	Digital Substations
EVerest	1/22/2025	1/28/2026	EV Charging
OpenSTEF	2/5/2025	2/4/2026	Grid Simulation and Modeling
Power Grid Model	2/5/2025	2/4/2026	Grid Simulation and Modeling
covXtreme	4/2/2025	4/1/2026	Grid Simulation and Modeling
CoMPAS	6/10/2025	6/2/2026	Digital Substations
FledgePower	6/10/2025	6/2/2026	Digital Substations
FIDOPower	6/4/2025	6/3/2026	Grid Simulation and Modeling

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SIG Meeting Schedule for September

All SIG meetings can be found on the LF Energy calendar (calendar.lfenergy.org) as well as the SIG Calendar (sigcalendar.lfenergy.org)

Days/times listed are US Eastern Time

➔ **SIG Leaders - share any updates for your SIGs**

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Project Pipeline

https://github.com/orgs/lf-energy/projects/2/views/5

- RTC-Tools is a mature, leading open-source solution for the operational optimization of water and energy systems. Contributed by Deltares and Shell. LF Onboarding completed and presenting in today's TAC meeting.
- CityLearn is an open source Farama Foundation Gymnasium environment for the implementation of advanced controllers for demand side building energy coordination and demand response in cities. It's focus is on residential buildings with the goal to shape the aggregated load profile using local and coordinated DERs. Submitted April 23, 2025; currently in LF Onboarding
- Global Granular Certificate Registry is a vendor-neutral, open-source, cloud-native ledger that issues, tracks, and retires Granular Certificates (GCs). Submitted June 11, 2025; currently in LF Onboarding.
- Project-Origin is an open-source initiative to create a federated, decentralized infrastructure for issuing, transferring, and verifying granular, time-based energy certificates. Submitted July 8, 2025; currently in LF Onboarding.
- Power Stability Wide Area Monitoring Protection (p-SWAMP) is a microservices based project focused on work within Wide Area Monitoring, Protection and Control (WAMPACS). LF Onboarding completed and presenting in today's TAC meeting.
- PowerCore will provide a vendor-agnostic, hardware-generic industrial informatics API for power-electronics systems, enabling portable, maintainable control firmware across diverse microcontroller SoCs. Submitted July 28, 2025; currently in LF Onboarding.
- Utility Rate Plan Exchange (URPX) aims to develop a comprehensive, standardized method for representing and exchanging utility rate plan data in machine-accessible format. Submitted August 3, 2025; currently in LF Onboarding.

Older projects in LF Onboarding

- OneNet Framework - awaiting approval of governance documents
- pyELQ: python Emission Localization and Quantification - working on name rights issues

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TAC Priorities as aligned to with TAC

DONE

- ✓ Move to monthly TAC meetings instead of every 3 weeks
- ✓ Start office hours for SIG leaders to share best practices (working on date/time reschedule)
- ✓ Spin down Data Standards and Tooling and Grid Operations SIGs
- ✓ Move affected project annual reviews to the TAC
- ✓ Security Audits - TAC align on two projects to prioritize (EVerest, PowSyBL)
- ✓ Project workshops with LF Energy Summit (tentatively Sep 10-11 in Aachen, Germany)
- ✓ Revisit TAC Leadership structure
- ✓ Project landscape https://landscape.lfenergy.org/ - Update this to reflect the latest projects and how we want to message the ecosystem
- ✓ Include LFESS Working Groups in TAC annual review process.
- ✓ Process for projects to request resources/funding for cloud infrastructure (https://github.com/lf-energy/tac/issues/477)
- ✓ Improve SIG support and interface to the TAC (https://github.com/lf-energy/tac/issues/544)

CURRENT FOCUSES

- Documentation audit/support (https://github.com/lf-energy/tac/issues/546)

NEXT FOCUSES

- Security Audits - TAC to prioritize next project(s) to focus on (Determine prioritization for Security Audits #408)
  - Considering lighter weight "security threat model analysis" for Incubation level projects
- Project Lifecycle - Review and make adjustments to align with current project needs (last changes made in 2021)
  - Perhaps should we start with a project questionnaire?
- Assemble and execute on a plan to inject fresh energy and increase engagement with the TAC

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Project Services Funding #613

The LF Energy Governing Board has approved an initial fund of $50,000 to go towards specific project infrastructure or services needs. These services could include marketing websites, documentation support, sandbox demo infrastructure, and release engineering.

- ➔ The Project Resource Request process has been updated to include this (see https://tac.lfenergy.org/tools/resource_request.html).
- ➔ Project board to track requests at https://github.com/orgs/lf-energy/projects/2/views/6
- ➔ We've also had one application already (see #596).

TAC Actions:

1. Align on the focus for funding to be Early Adoption stage projects; Incubation and Sandbox projects may be considered after Early Adoption project requests are fulfilled.
2. Discuss and get alignment on the operational plan:

- LF Staff review for applicability and budget space.
- LF Staff sends to the TAC for initial review within three business days of the submission.
- TAC has seven business days for feedback/questions.
- If nothing, do an LFX Vote to approve. If there are questions, resolve and then do an LFX vote, then if the TAC chooses to move forward
- LF Staff to follow up with the project on the resource request and engage any other teams to fulfill the request.

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Project website policy #582

We've formalized the policies around project websites, specifically:

- The website MUST have the 'Linux Foundation Projects' header, cookie consent integration, and legal footer. Contact LF Staff if you need the code/language to include.
- The website MUST NOT collect any personally identifiable information (PII) unless it goes through an approved LF data collection system. This means that the project can't set up a separate Google Form for collecting PII, or have PII collected go to a system owned by a separate entity.
- The website MUST provide admin access to the LF. This includes any code repository used to build the site, access to a hosting provider that hosts the site, and the ability to manage the site's content. The LF will ensure these credentials are only used for exceptional circumstances.
- The website MUST NOT enable any third-party functionality or integrations, particularly those that collect and/or share any user-submitted data without LF approval.
- The domain name and DNS for the website MUST be owned by the LF and managed in LFX PCC. LF IT and PMO can easily make any adjustments on behalf of the project.
- Ensure that the website does not bias any particular company (e.g., no links to a vendor's products from the website, no promotions or offers).
- Any use of LF marks must comply with the LF Trademark Policy and LF Projects Trademark Policy.

We can help any projects needing assistance here, and we will be also proactively auditing projects.

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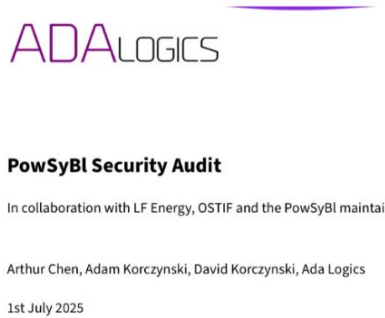
PowSyBL Security audit complete! #594

More details at https://lfenergy.org/audit-of-lf-energy-powsybl-ensures-security-of-power-systems-tool/



Jul 30, 2025

Audit of LF Energy PowSyBl Ensures Security of Power Systems Tool

LF Energy is pleased to announce the publication of a comprehensive security audit of the PowSyBl project, conducted by Ada Logics and coordinated by the Open Source Technology Improvement Fund (OSTIF). This audit was funded by LF Energy as part of our ongoing commitment to improving the security and resilience... Read More.

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New Project/Working Group Proposal: RTC-Tools #344

5:10 pm - 5:30 pm

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New Project/Working Group Proposal: Power Stability Wide Area Monitoring Protection (p-SWAMP) #585

5:30 pm - 5:50 pm

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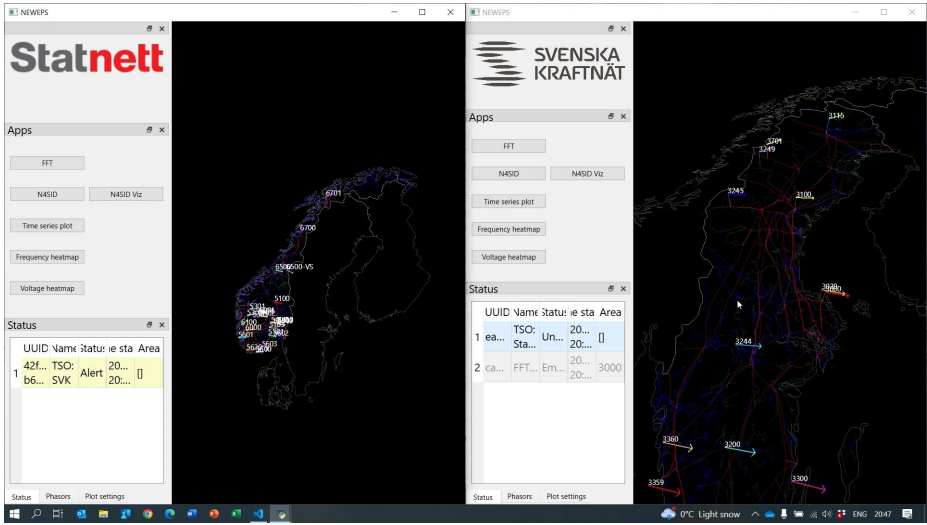
Statnett

– Statnett R&D WAMPAC power- Stability Wide Area Monitoring Protection (p-SWAMP)

Motivation



[What's Happening in Spain? The 2025 Blackout and the Global Threat Ahead!]

[28 April Blackout]

[NEWEPS - Nordic Early Warning Early Prevention system]

[NEWEPS Demo C - Part 2, Voltage Stability Monitoring on Vimeo]

Statnett SF
The Norwegian Transmisjon System Operator (TSO)

Owned by the Norwegian State through the Ministry of Energy

Owns and operates the national high voltage transmission grid in Norway, i.e. the electricity highways.

Operation of the Nordic power grid is a collaboration between Statnett in Norway , Svenska kraftnät in Sweden, Fingrid in Finland and Energinet in Denmark.

Grid Map downloads

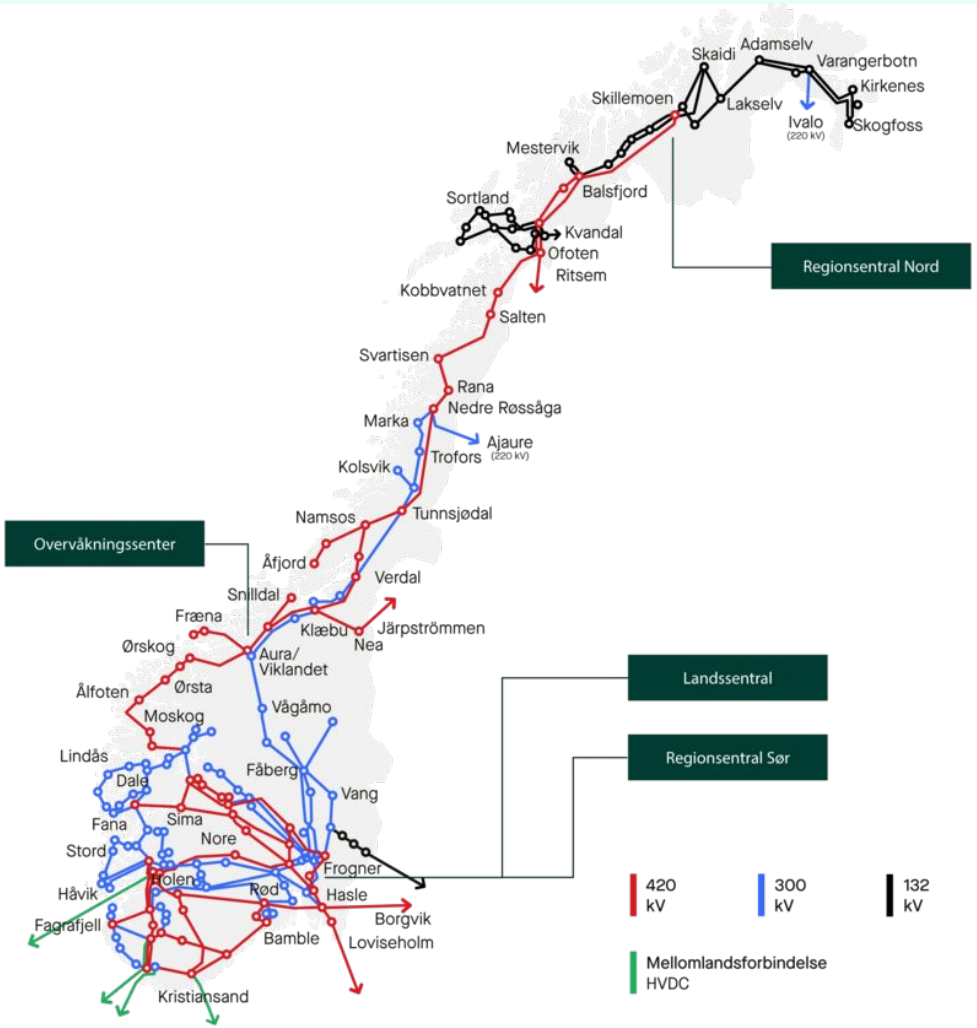
Statnett SF

11 500 km high voltage lines

2 550 km subsea and underground cables

190 substations

1 600 employees, 5 office locations (Oslo, Alta, Trondheim, Sunndalsøra and Sandnes)

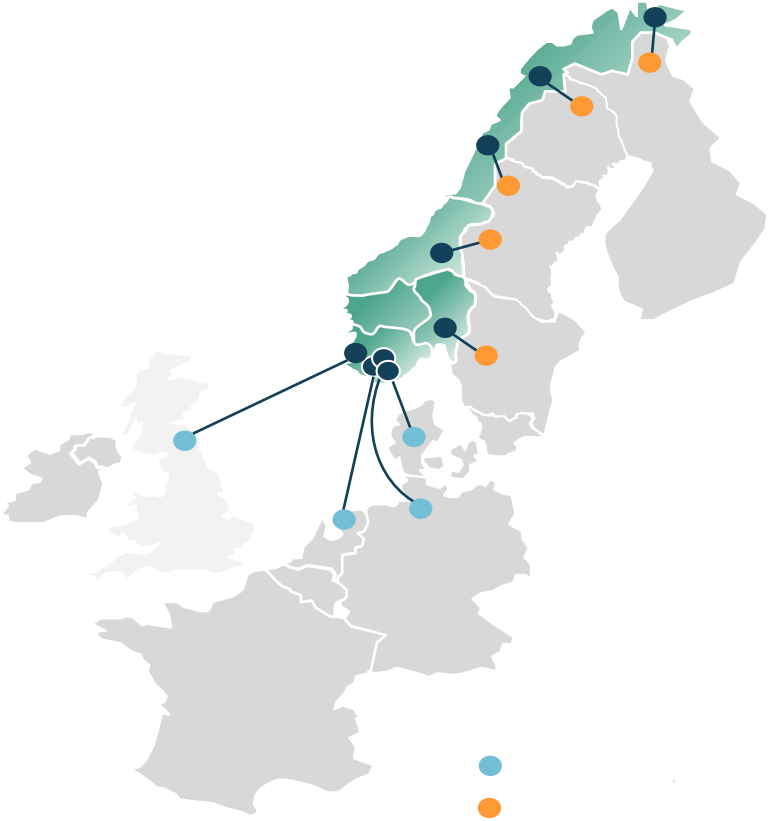


The Norwegian power system

Consumption
134 TWh

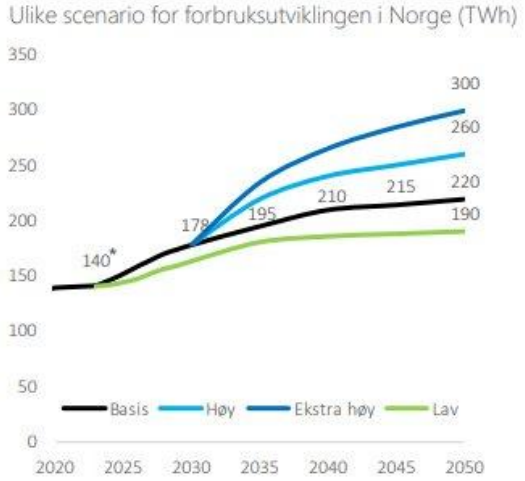
Production
146 TWh

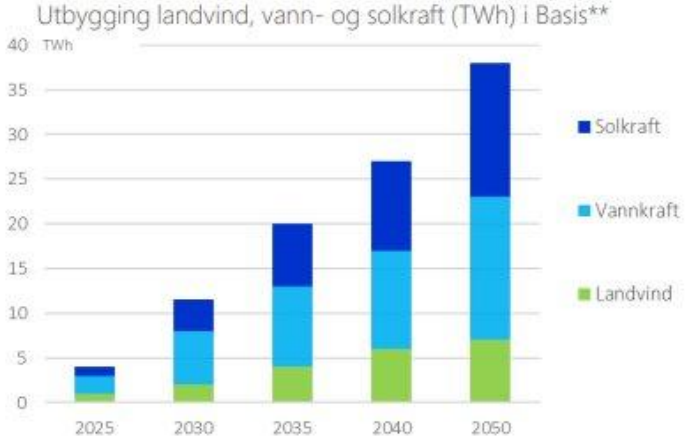
Net exchange
12.5 TWh to:
Sweden, Finland, Denmark, UK, Germany and Netherlands



Statnett – Challenges

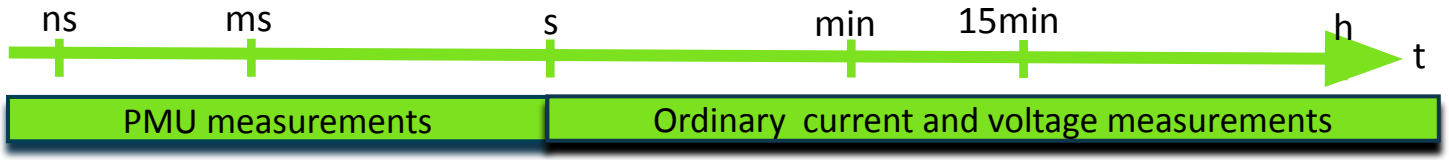
Prognoses indicate higher consumption in Norway, connection of new larger consumers and more renewable production units (off-shore wind, on-shore wind and photovoltaic).



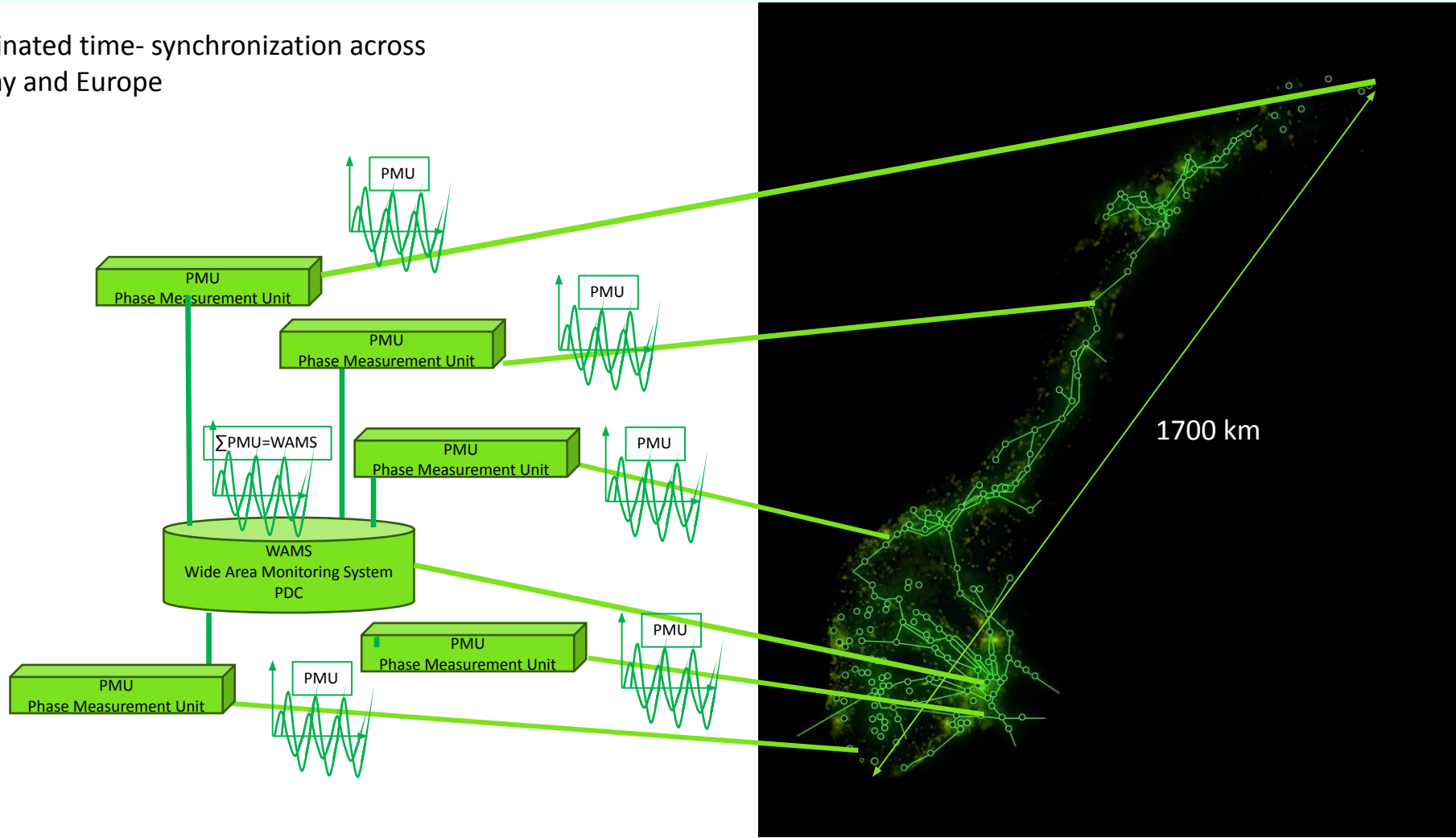


Power production change from hydro, to mix of sun and wind, connected to the grid via power electronics, gives the grid new characteristic, and needs to be monitored in a new way.

The grid needs to be monitored at millisecond level

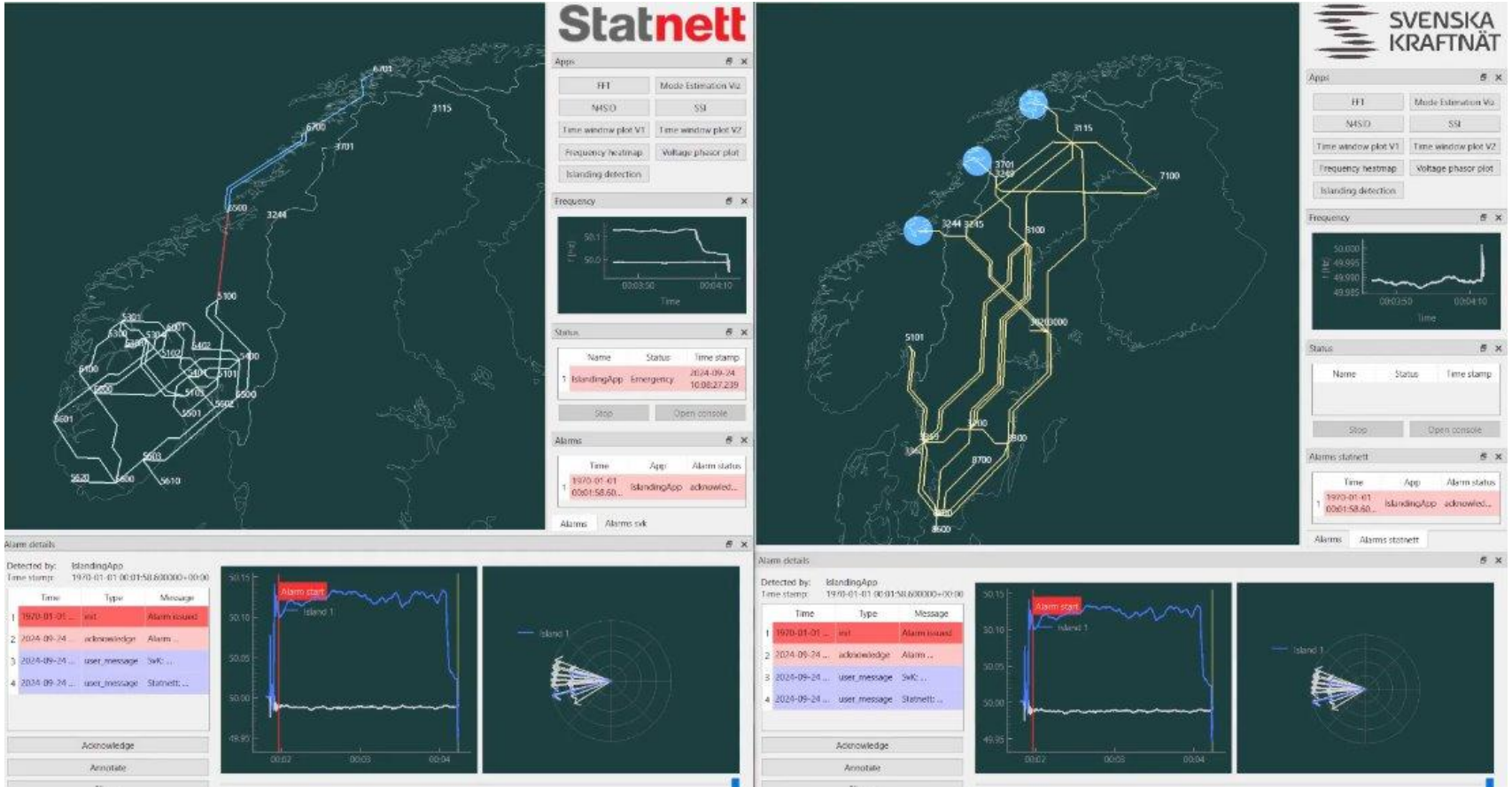


Coordinated time- synchronization across Norway and Europe

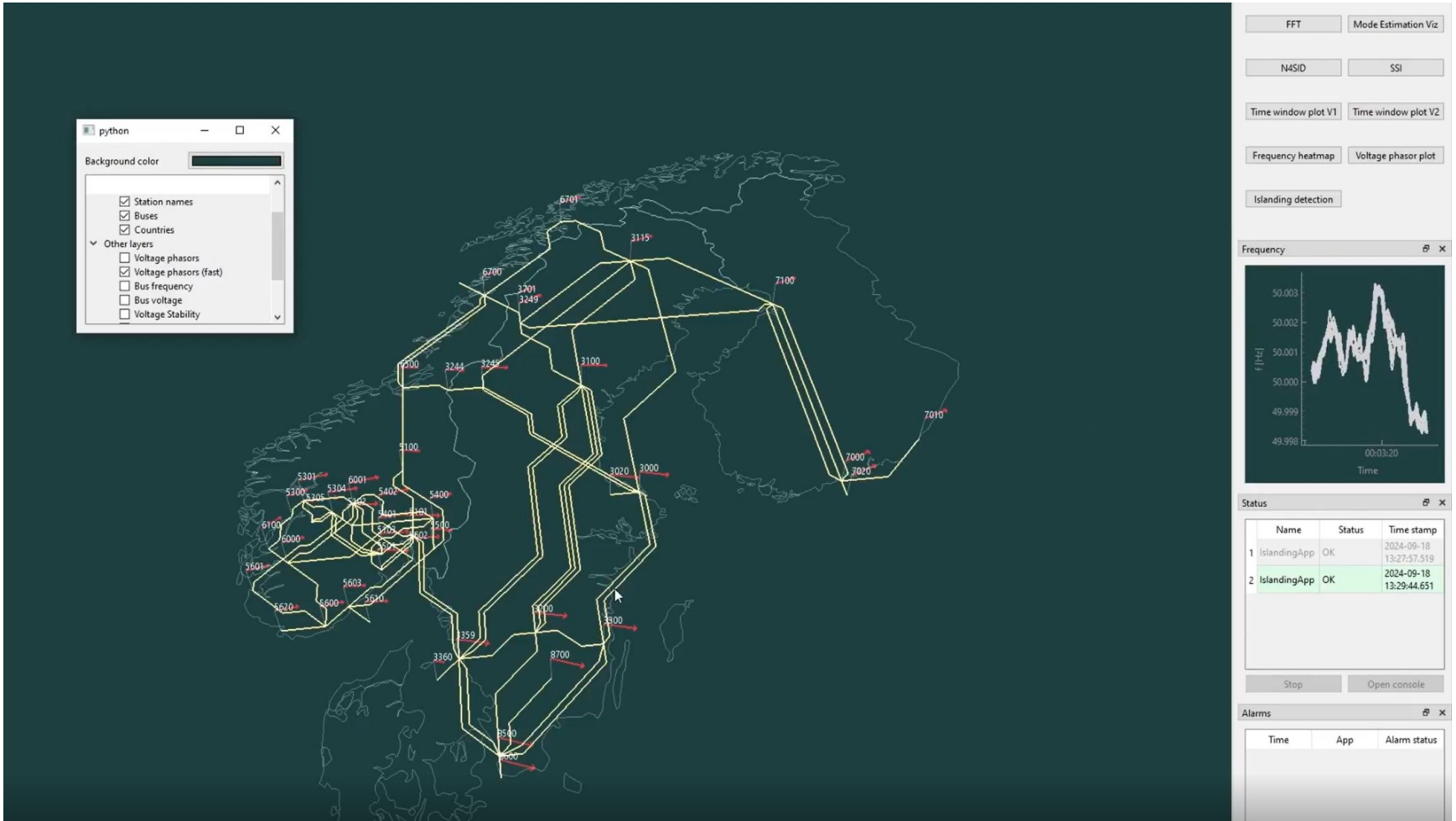


Alarm coordination between TSOs

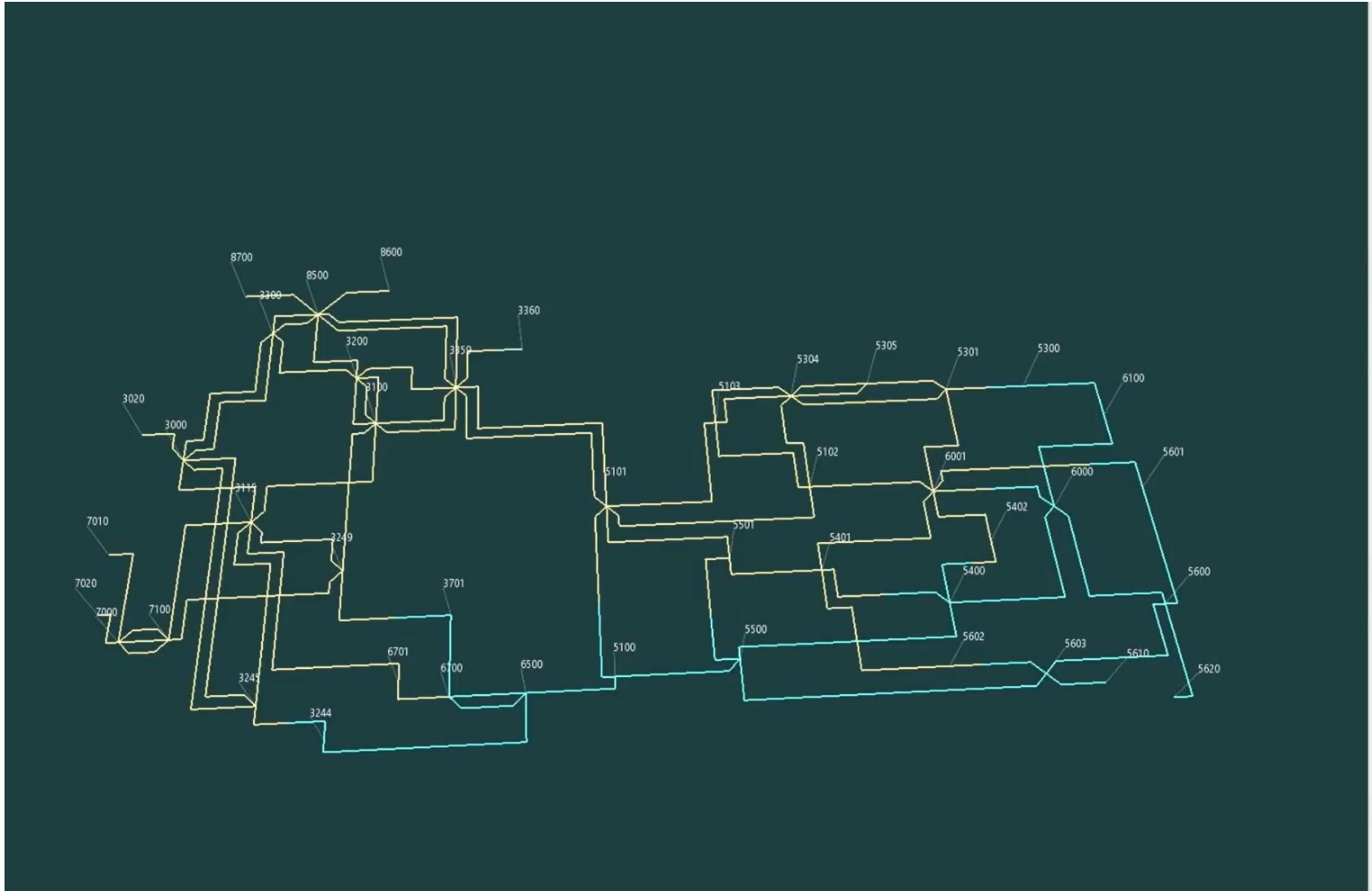
Alarm coordination between TSOs for Island detection

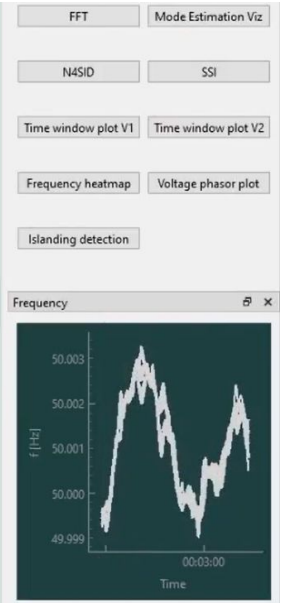


All simulations based on CIM -models

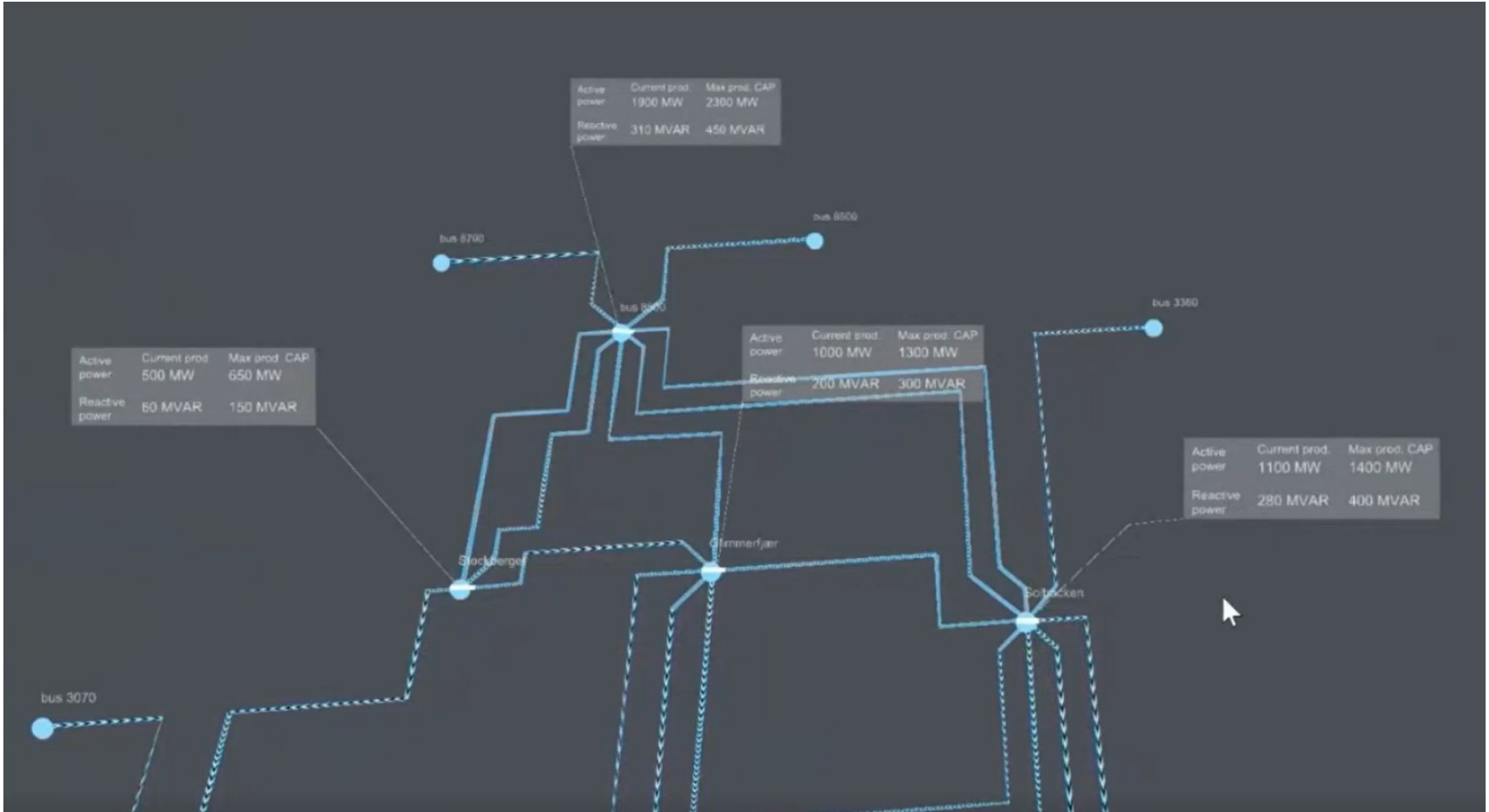


All simulations based on CIM -models

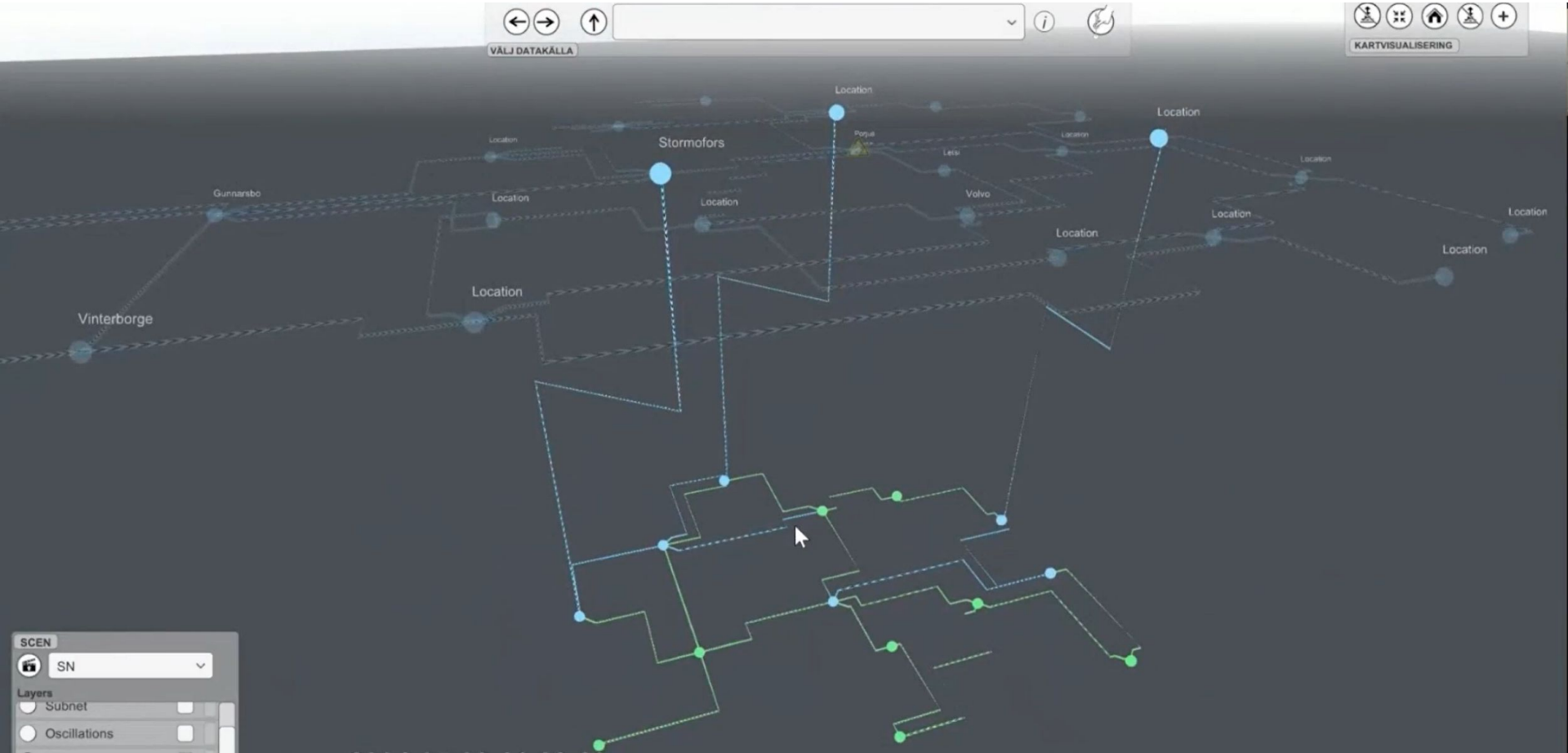




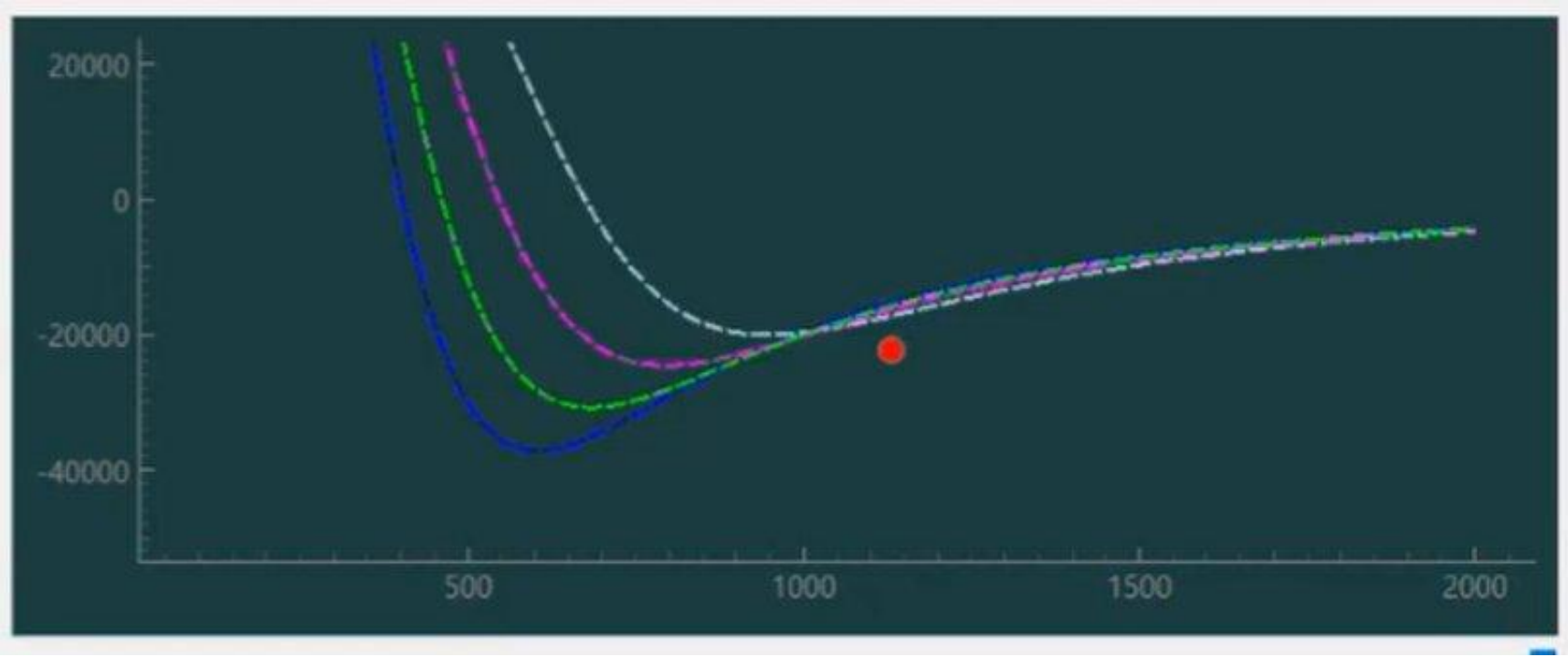
Drill down functionality for alarm handling in sub grid by use of 3D



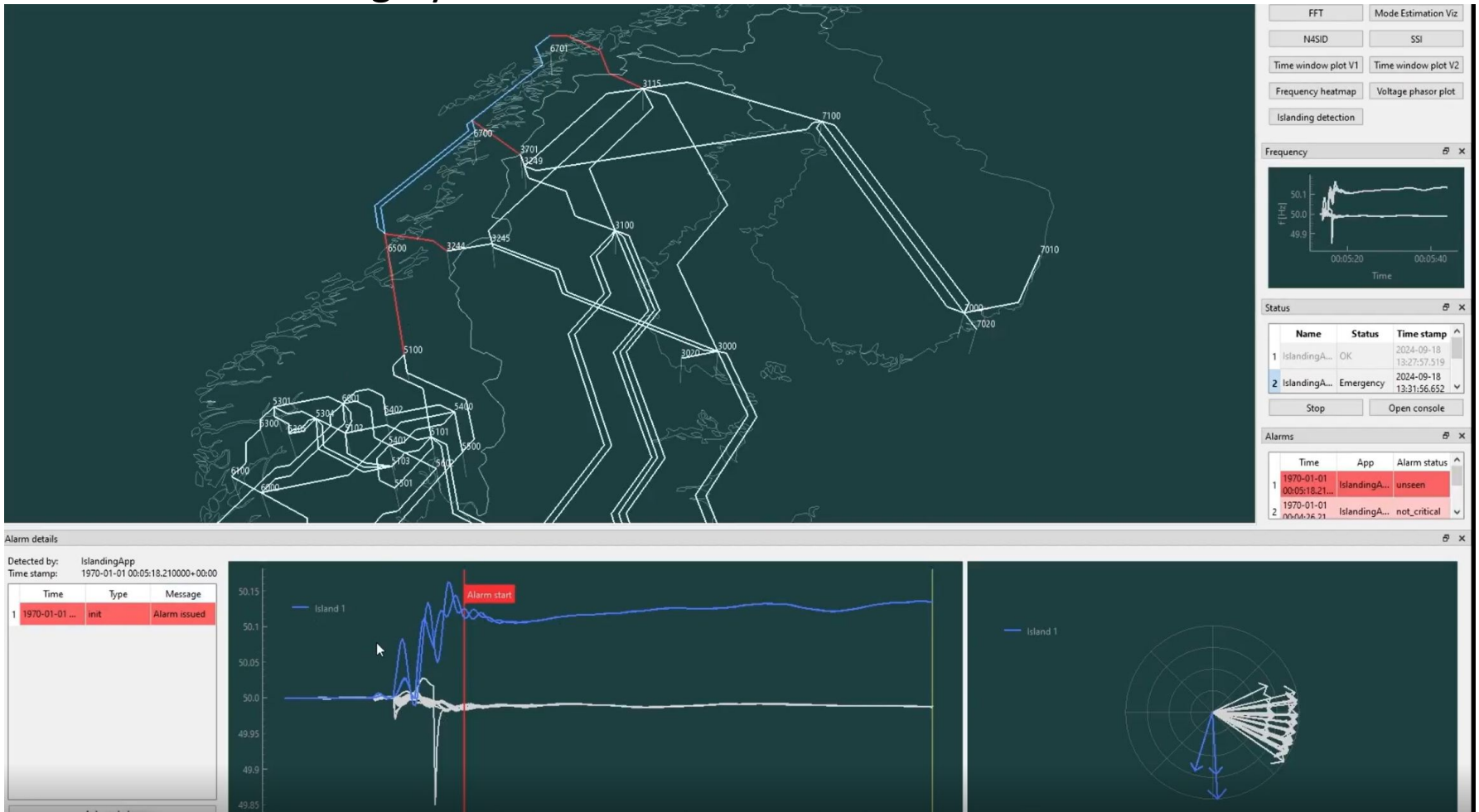
Drill down functionality for alarm handling in sub grid by use of 3D



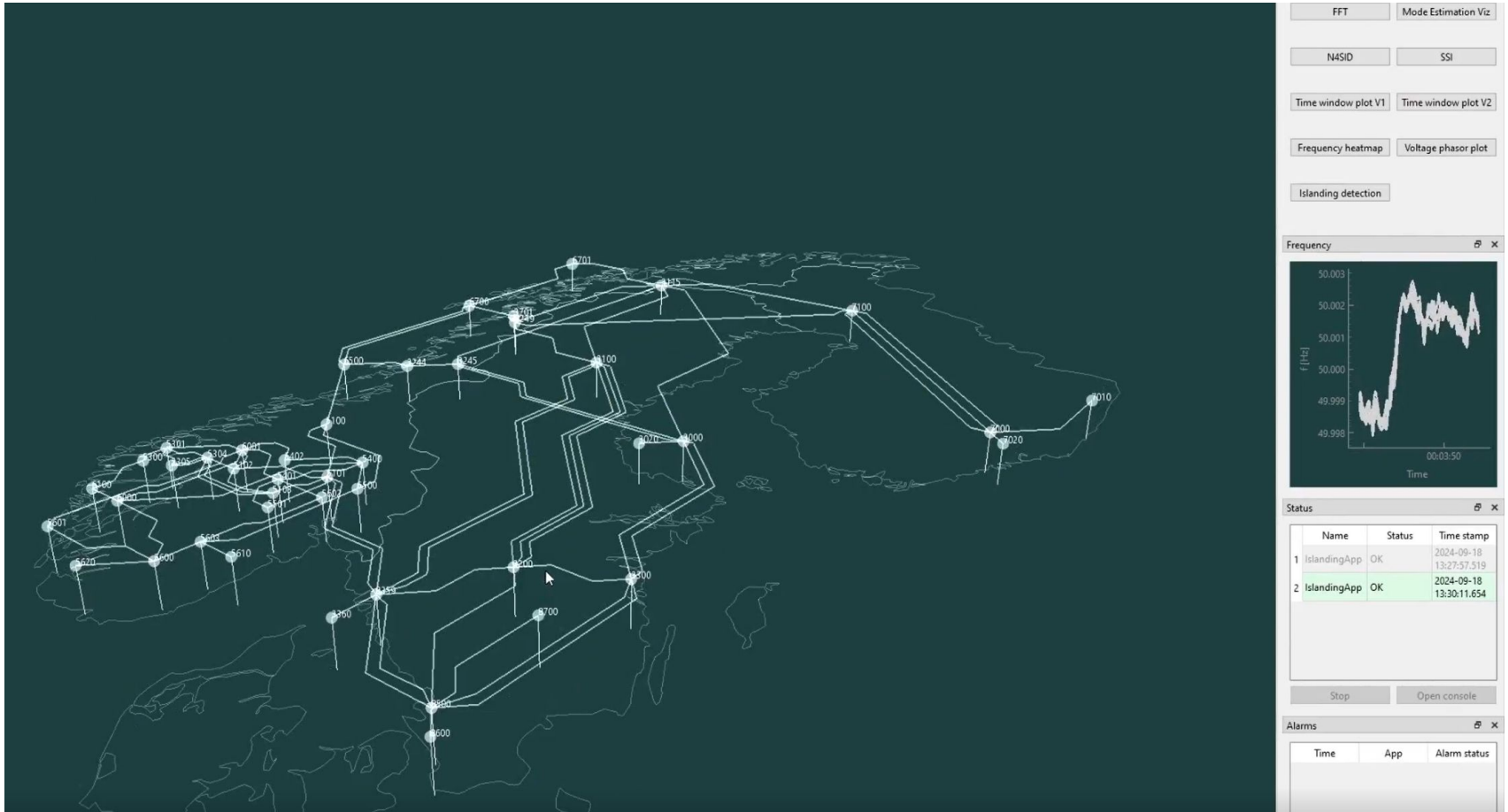
Detection voltage stability



Detection of Islanding by use of 3D



Oscillation detection by use of advanced UI to show how nodes interacts

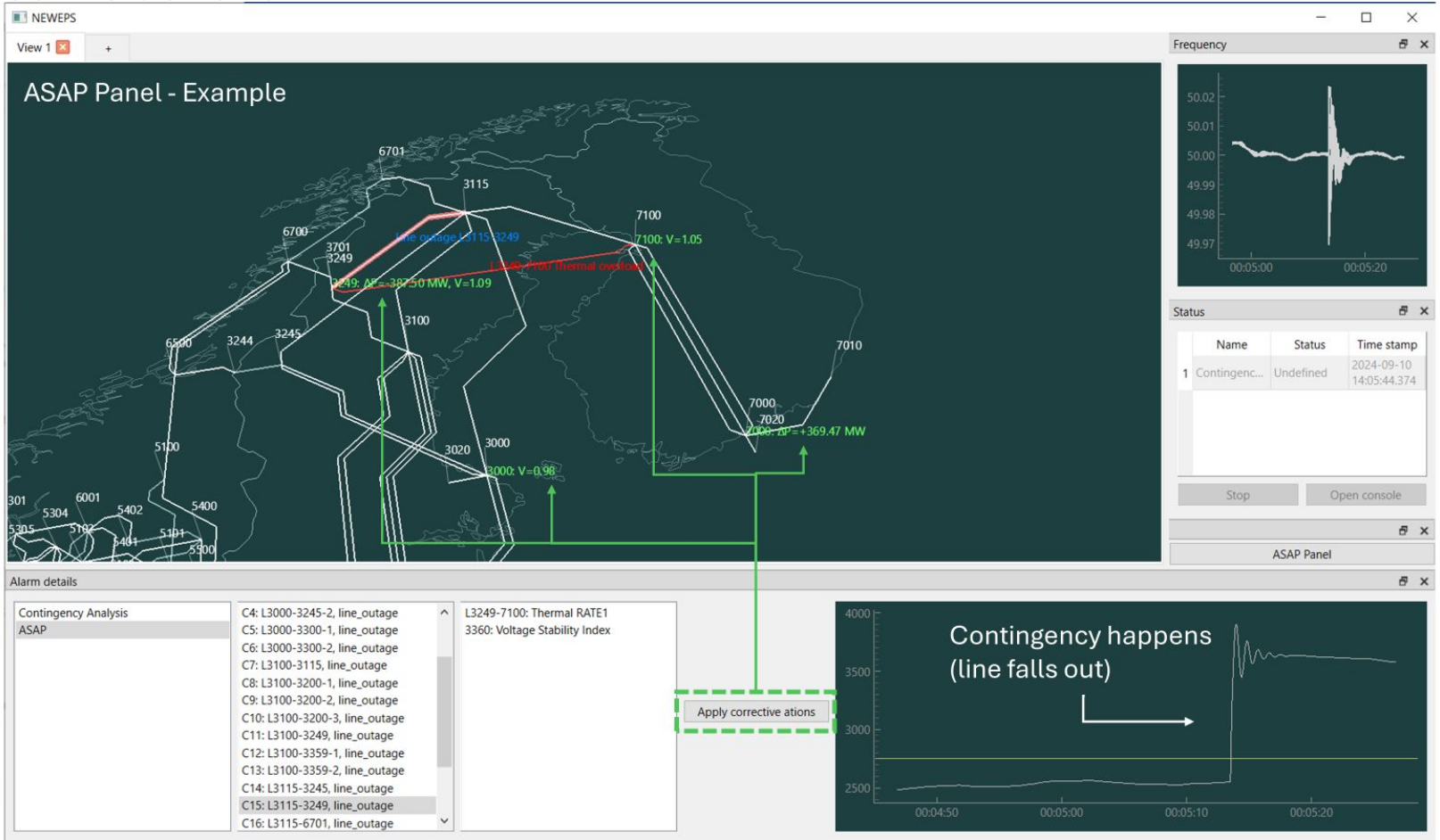


Visualization of Oscillation by use of 3D

Oscillation detection by use of advanced UI to show how nodes interacts

Detection of Islanding by use of 3D

Operation awareness on contingency analyze and Corrective actions



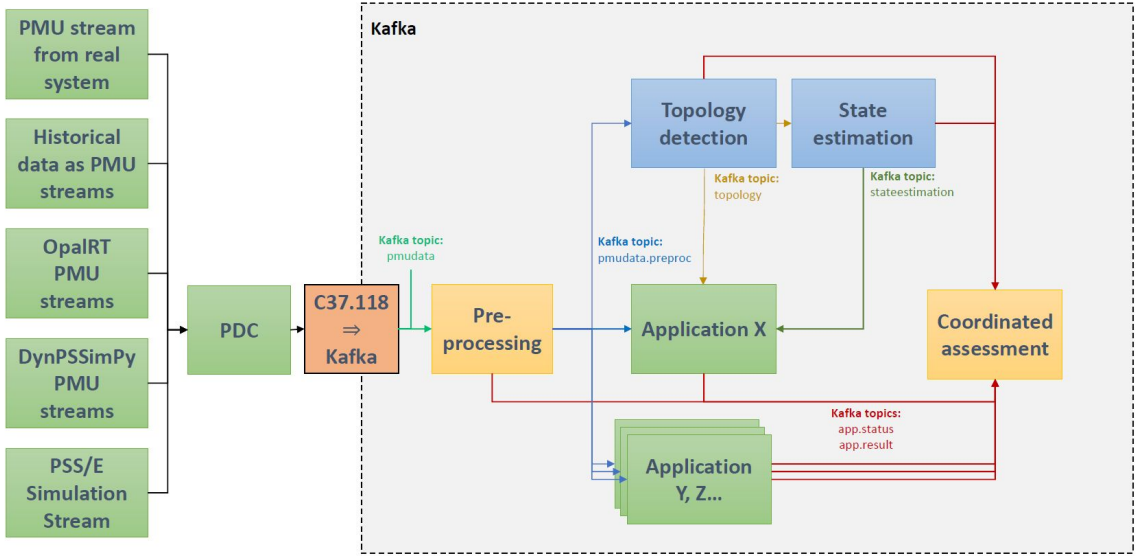
Architecture of the implemented platform

Development of a software platform to validate the detection and visualization methods

Core programming in Python

Modular structure with several independent applications

Communication between applications with a Kafka stream

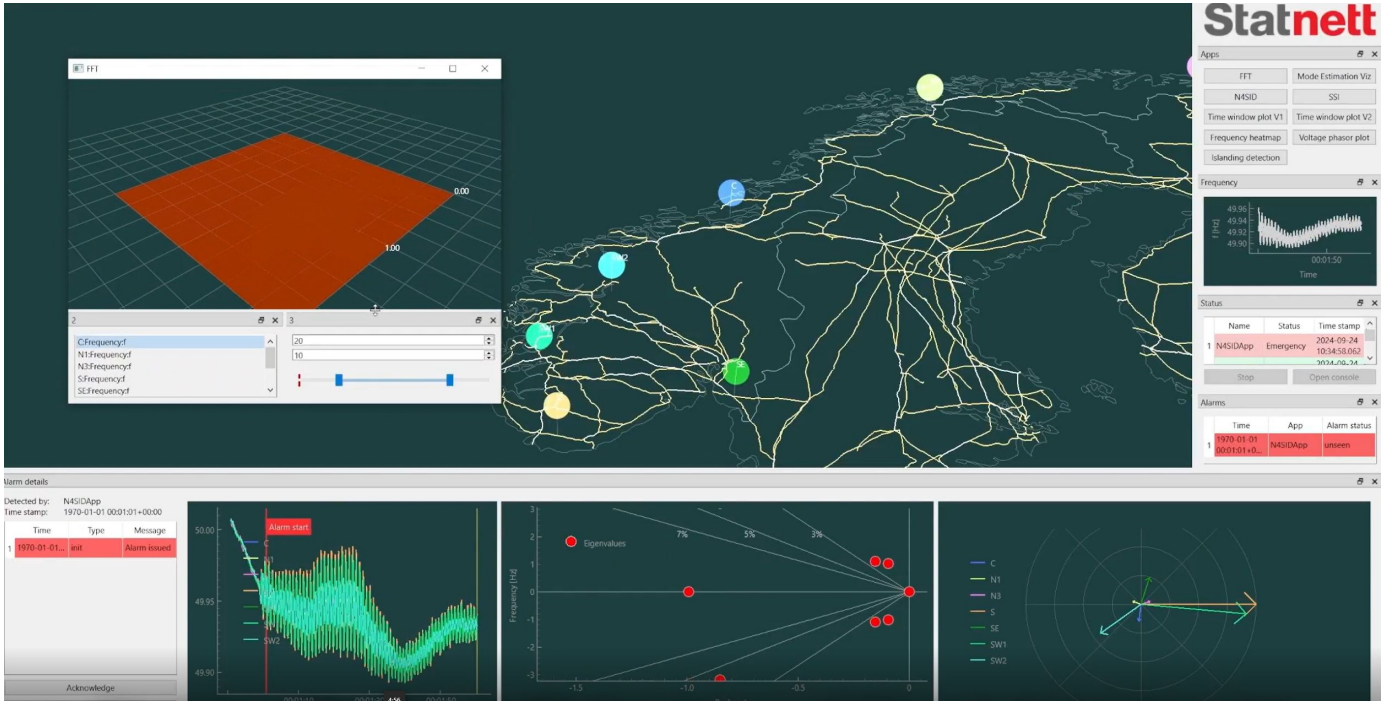


Voltage Stability
https://youtu.be/B2XXrjwevcs

Oscillations
https://youtu.be/IB7JYJ0BG9U

TSO Coordination
https://youtu.be/PCm2WNXBtj0

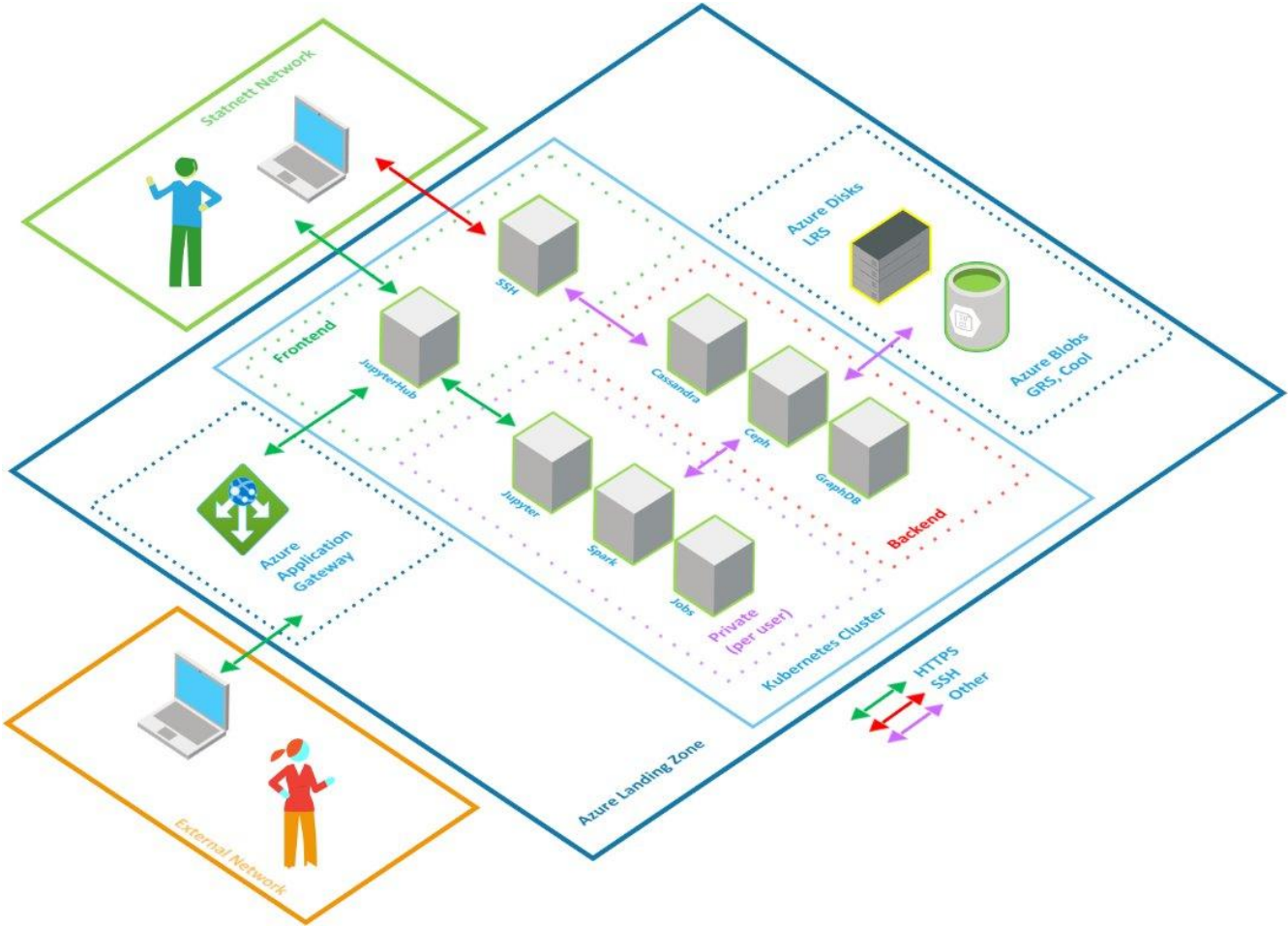
SCOPF (ASAP-NEWEPS)
https://youtu.be/wAdYy3pgG5A

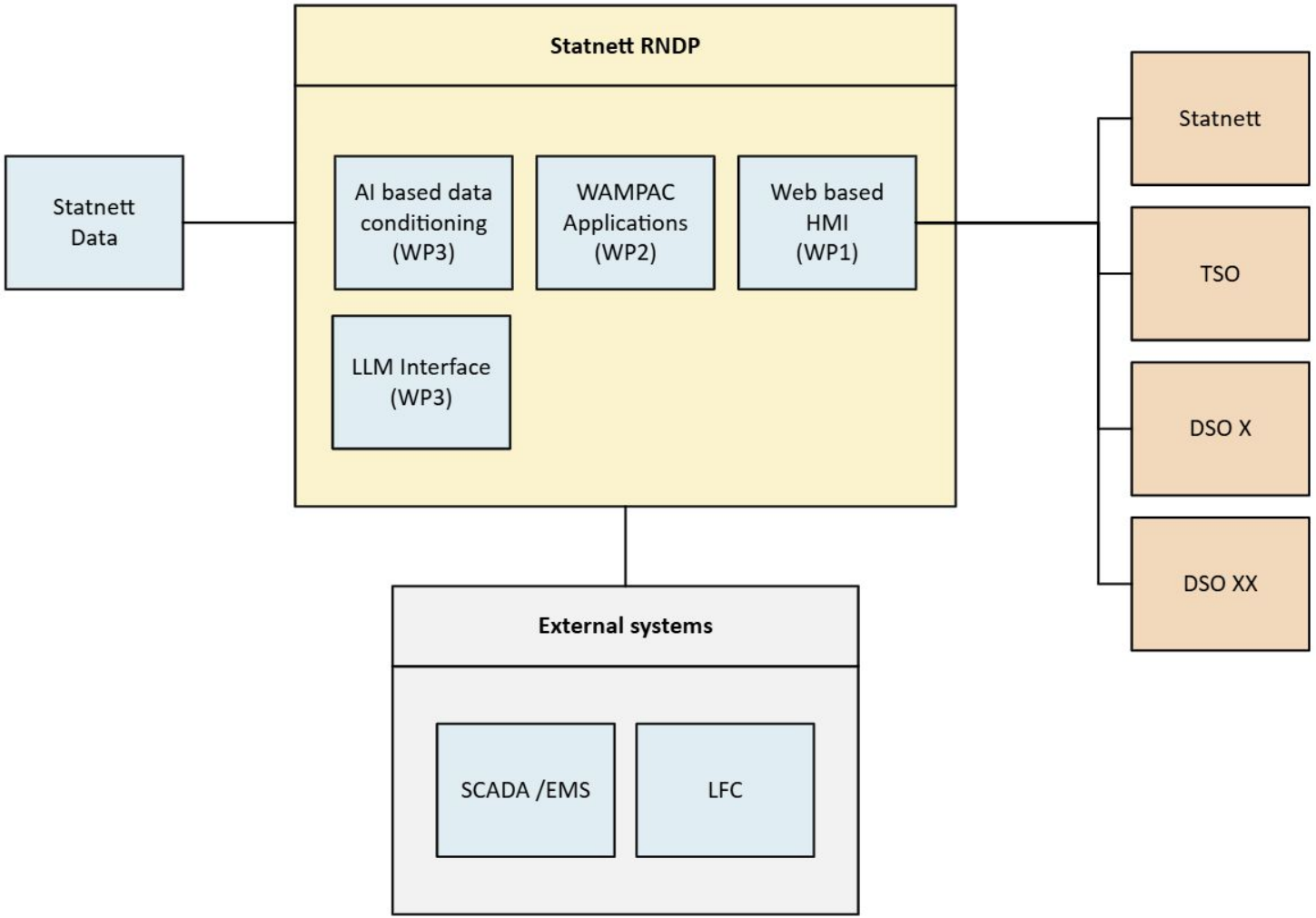


RNDP Platform

- Kubernetes hosted on Azure
- Notebook interface (Jupyter)
  - Robust ecosystem for data science
  - Rich visualizations
  - Supports Python (mamba), R, Julia, and more
- Shared POSIX filesystem (Ceph)
- Kubernetes namespace isolation
  - Spark clusters for big-data workloads
  - Kubernetes jobs for long-running workloads
- Statnett integrated
  - Entra
  - GitLab
  - Artifactory

- Backend
  - Ceph
  - Cassandra
  - Hosted (GraphDB)
- Frontend
  - JupyterHub
    - Services
  - SSH
  - Hosted
- Private
  - Jupyter
  - Spark
  - Kubernetes (Jobs)

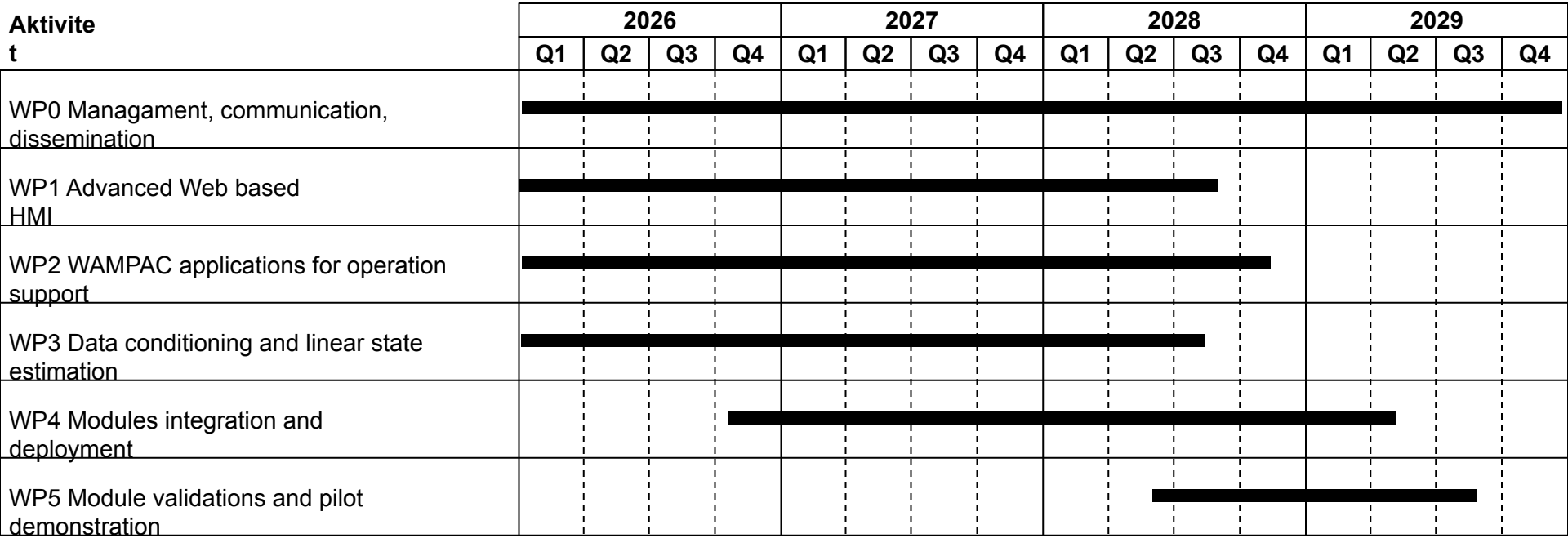




Project p-SWAMP Tasks and work packets

- WP0 Managament, communication, dissemination
- WP1 Advanced Web based HMI
- WP2 WAMPAC applications for operation support
- WP3 Data conditioning and linear state estimation
- WP4 Modules integration and deployment
- WP5 Module validations and pilot demonstration

Project p-SWAMP timeline



Annual Review: Battery Data Alliance #57

5:50 pm - 6:10 pm

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Battery Data Alliance

Sustainable open source software and best practices for the battery industry

LF Energy Summit September 2025 Meeting

Presented by: Gabe Hege

Agenda

Review Mission & Value Proposition

Battery Data Landscape

Key Projects

- Connector Library (from AmpLabs, Admiral, BattGenie)
- BattETL & BattDB (from BattGenie)
- Battery Data Format (from Ohm)
- BattInfo - Battery Ontology

How to Participate

Key Problem

No clear standards
+ Redundant work
+ Lack of collaboration
= **Slow Progress**

Our Solution

Strong Community
+ Open Source Software
+ Best Practices
= **Safer/Cheaper Batteries**

Industry Focus

Design

Lack of Open Source battery data

Lack of common platform & format

Testing

Manual configuration of testing equipment

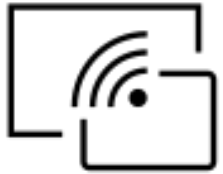
Standards vs. Execution = Huge Gap

Manufacturing

Repetitive work on schema design

Barriers for collaboration

Telemetry



Untapped Area in the Open Source World

Software Projects

- BattETL & BattDB
- BattInfo - Battery Ontology
- Battery Data Format

BattETL & BattDB

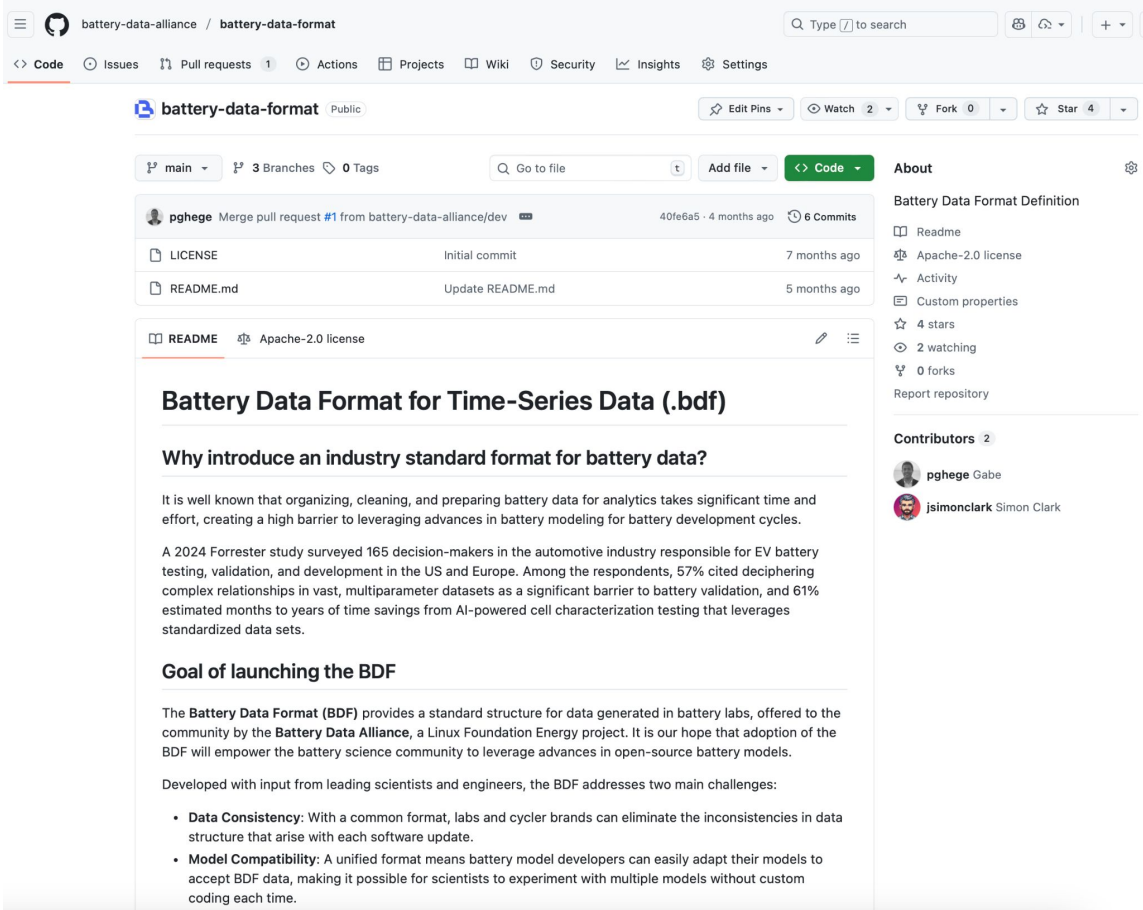
BattETL

BattETL is a well-tested and an enterprise-ready python module for **E**xtracting, **T**ransforming, and **L**oading battery cycler data to a database. BattETL can also be used just for data extraction and transformation if a database is not desired. Currently data from Maccor and Arbin cyclers are supported.

Battery Data Format

Donated by Ohm.ai

BDA can use this format if one is needed as reference for industry use cases



BattInfo

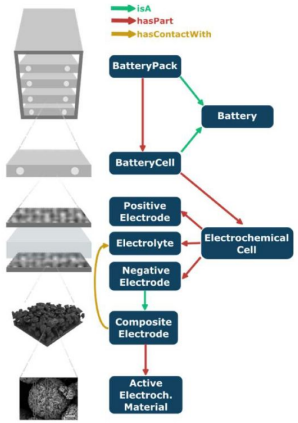
Battery Ontology

Linked Data Primer (slides)

Takeaway: If we can map each cycler format to the ontology, we will inherit the value of ‘conversion’

How to link data
2. Use open, controlled vocabularies

BattINFO: a machine-readable description of concepts in batteries and electrochemistry.



Concepts are organized as a network:
Nodes: Battery Concepts
Edges: relations among concepts

Provides:
- The vocabulary to index battery data
- The connections representing battery knowledge

BDF Supports FAIR Data Practices

Published March 22, 2025 | Version 1.2.1

Dataset | Open

Discharging Time Series of a CR2032 Battery at 11 mA

Clark, Simon (Data collector)[1]; Wagner, Nils Peter (Data collector)[1,2]

Show affiliations

FAIR Score: ✅ 91.67%

Scope

This record contains raw data from the constant-current discharge of a CR2032 lithium coin cell at 11 mA. The test was performed using a BioLogic battery cycler with data recorded at 1-second intervals. The CR2032 cell is manufactured by VARTA and was tested in ambient laboratory conditions. The dataset is intended to demonstrate ontology-based linked data reporting that is also consistent with the FAIR principles. RDF metadata is made available in metadata.jsonld and metadata.html formats.

Files

Raw Data

Filename	Description	Format	Usage
sintef__cr2032__discharging_11_mA__20240216.bdf.csv	Raw discharge time series in CSV format.	CSV	Main file for time series visualization and processing.
sintef__cr2032__discharging_11_mA__20240216.bdf.json	Time series data in structured JSON format.	JSON	Demonstration of alternative formats for time series data.
sintef__cr2032__discharging_11_mA__20240216.bdf.txt	Tab-separated plain text file containing the same data.	TXT	Demonstration of alternative formats for time series data.
sintef__cr2032__discharging_11_mA__20240216.bdf.parquet	Compressed binary format optimized for large-scale data processing.	Parquet	Demonstration of high-performance serialization of time series data.

Largest Open Source Datasource in BDF

Published July 1, 2025 | Version v1

Dataset | Open

Dataset for publication "Toward an Autonomous Robotic Battery Materials Research Platform Powered by Automated Workflow and Ontologized Findable, Accessible, Interoperable, and Reusable Data Management"

Svaluto-Ferro, Enea (Data collector) [1]; Kimbell, Graham (Data curator) [1]; Kim, YeonJu (Data collector) [1];
Plainpan, Nukorn (Data manager) [1]; Kunz, Benjamin (Data collector) [1]; Scholz, Lina (Data collector) [1, 2];
Laeubli, Raphael (Data collector) [1, 2]; Becker, Maximilian (Data collector) [1]; Reber, David (Data collector) [1];
Kraus, Peter (Data curator) [1]; Kühnel, Ruben-Simon (Data collector) [1]; Battaglia, Corsin (Contact person) [1, 2, 3]

Hide affiliations

1. ROR Swiss Federal Laboratories for Materials Science and Technology
2. ETH Zürich
3. ROR École Polytechnique Fédérale de Lausanne

Contributors

Data curator: Clark, Simon [1]

Hide affiliations

1. Stiftelsen for industriell og teknisk forskning

Scope

This dataset comprises detailed data from 199 coin cell batteries featuring either NMC//graphite or LFP//graphite chemistries cycled for 1000 cycles. All batteries were assembled and cycled using the automated robotic battery materials research platform, Aurora, at Empa, the Swiss Federal Laboratories for Materials Science and Technology, within the Laboratory for Materials for Energy Conversion.

This dataset accompanies the publication:
Toward an Autonomous Robotic Battery Materials Research Platform Powered by Automated Workflow and Ontologized Findable, Accessible, Interoperable, and Reusable Data Management.
Batteries & Supercaps, 2025, https://doi.org/10.1002/batt.202500155

Battery cell metadata file:

- **Filename:** `empa__ccid000XXX.metadata.json`
- **Description:** Contains semantically annotated battery assembly data along with the cycling protocol applied to the specific battery cell. The file is structured in JSON-LD format and leverages the Battery Interface Ontology (BattINFO) domain to ensure semantic interoperability and rich data description.
- **Reference:** Battery Interface Ontology — BattInfo documentation

Battery cell cycling data files:

- **Filenames:**
  - `empa__ccid000XXX.bdf.csv`
  - `empa__ccid000XXX.bdf.parquet`
- **Description:** Cycling data is provided in two formats: CSV and Parquet. Both contain identical data. The CSV format enables straightforward human inspection, while the Parquet format supports faster parsing and is optimized for automated processing. These files follow the Battery Data Format (BDF) for Time-Series Data, as recommended by the Battery Data Alliance.
- **Reference:** Battery Data Alliance - Battery Data Format Definition

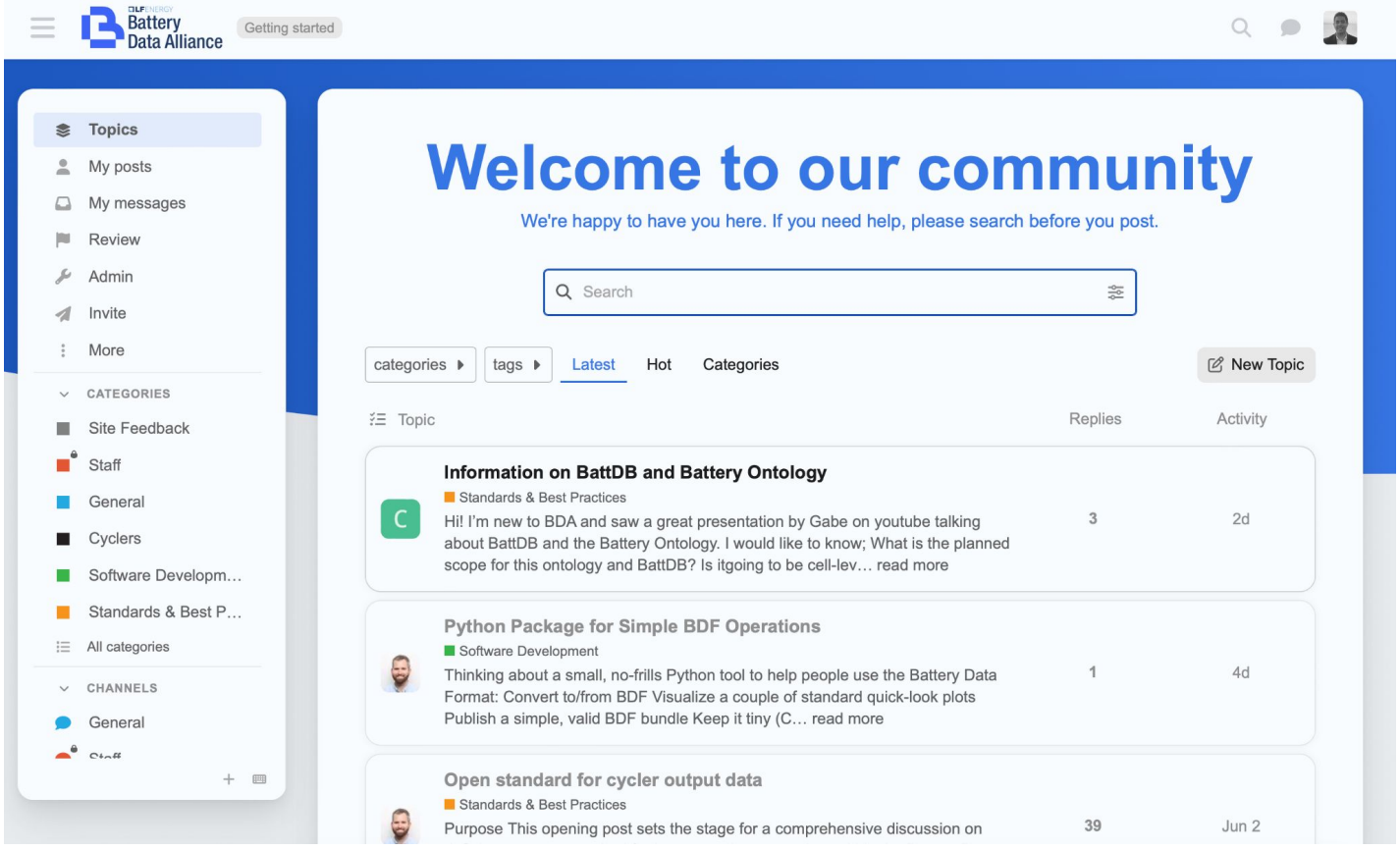
Files

Dataset-rocrate.zip

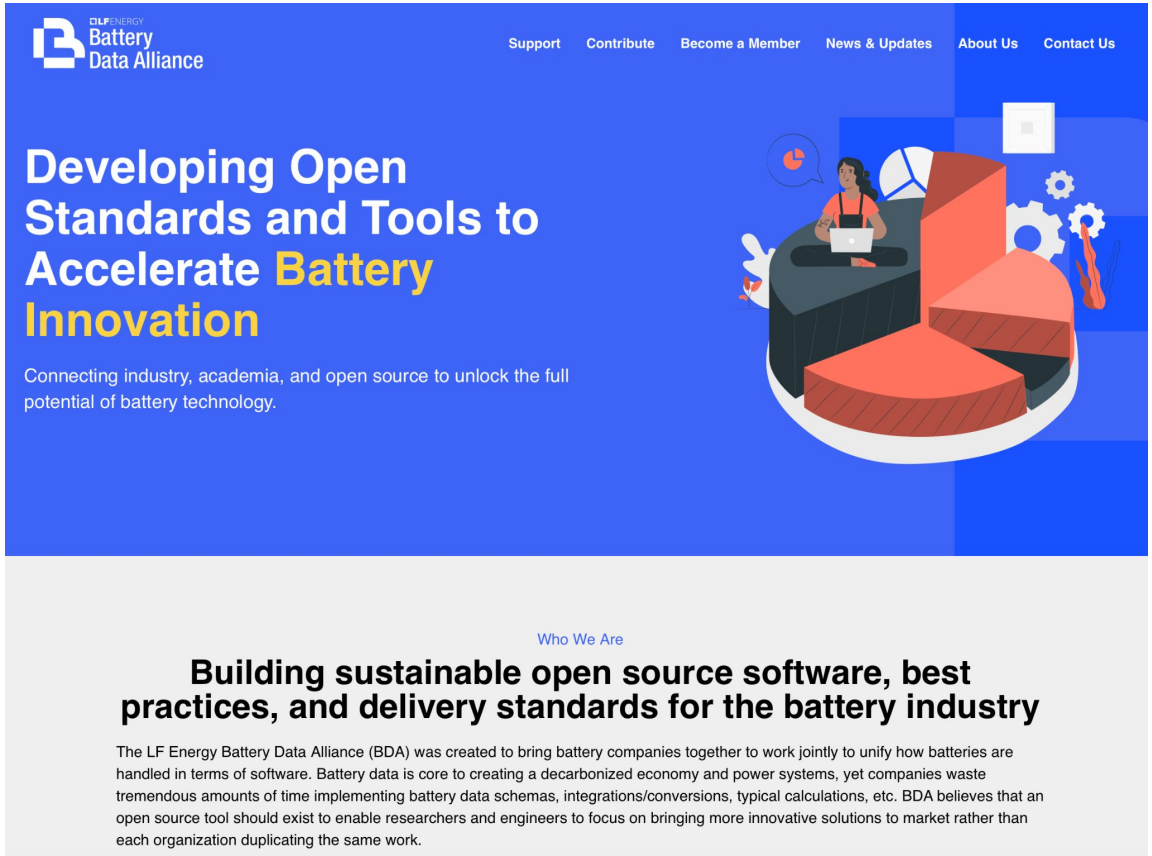
Dataset-rocrate.zip

empa__ccid000001	
empa__ccid000001.bdf.csv	17.6 MB
empa__ccid000001.bdf.parquet	5.1 MB
empa__ccid000001.metadata.json	55.8 kB
empa__ccid000002	
empa__ccid000002.bdf.csv	19.8 MB
empa__ccid000002.bdf.parquet	5.5 MB
empa__ccid000002.metadata.json	55.9 kB
empa__ccid000003	
empa__ccid000003.bdf.csv	18.6 MB
empa__ccid000003.bdf.parquet	5.3 MB
empa__ccid000003.metadata.json	55.8 kB
empa__ccid000004	
empa__ccid000004.bdf.csv	20.3 MB

Discourse Community

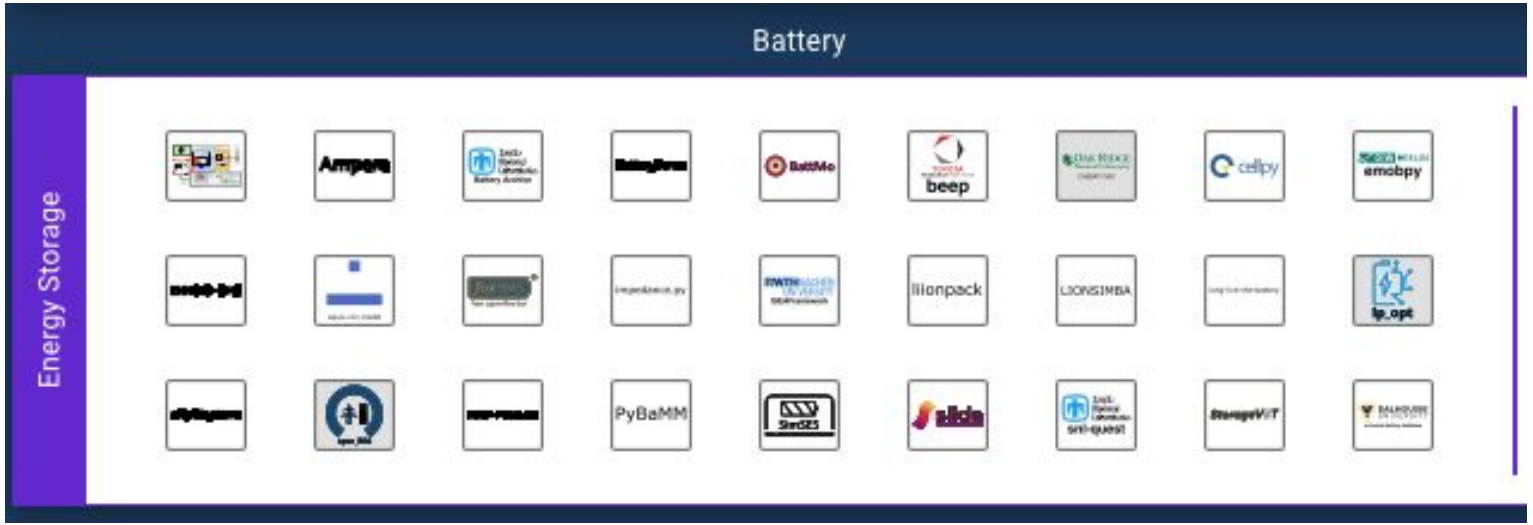


New Website


LF ENERGY
Battery
Data Alliance
Support
Contribute
Become a Member
News & Updates
About Us
Contact Us
Developing Open Standards and Tools to Accelerate Battery Innovation
Connecting industry, academia, and open source to unlock the full potential of battery technology.
Who We Are
Building sustainable open source software, best practices, and delivery standards for the battery industry
The LF Energy Battery Data Alliance (BDA) was created to bring battery companies together to work jointly to unify how batteries are handled in terms of software. Battery data is core to creating a decarbonized economy and power systems, yet companies waste tremendous amounts of time implementing battery data schemas, integrations/conversions, typical calculations, etc. BDA believes that an open source tool should exist to enable researchers and engineers to focus on bringing more innovative solutions to market rather than each organization duplicating the same work.

Thank You!

LF ENERGY Battery Software Landscape



Battery Software Landscape

Active in 2023

Modeling & Optimization Software
PyBaMM
Liionpack
PETLION
BattMo

Cycler Converters
Cellpy
PyMacNet
pycti-arbin

Data Management
Galv
Battery Archive
Universal Battery Database
Beep
battery-schema-utility

API & Framework Definition
impedance.py
Battery-api (Galv)
Battery-lcf
CAEBAT OAS/VIBE
ISEAFramework

Ontology
BattInfo

Annual Review: OperatorFabric #71

6:10 pm - 6:30 pm

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Closing and Next Meeting

6:30 pm - 6:30 pm

LF ENERGY

Next TAC Meeting

The next meeting of the LF Energy TAC is scheduled for September 9, 2025 at 4:00 pm Central European Time as a joint meeting with the LF Energy Governing Board in person at LF Energy Summit. Meeting is for TAC representative ONLY.

The following meeting of the LF Energy TAC is scheduled for October 14, 2025 at 4:00 pm Central European Time
Agenda tentatively to include:

- General Updates
- Annual Review: GridFM #260
- Annual Review: Archimate SIG #93
- Annual Review: NODE Collective #108
- Annual Review: Grid Edge Interoperability & Security Alliance (GEISA) #230
- Marketing/PR/Events update

To add agenda items, go to https://github.com/lf-energy/tac/issues/new/choose.
You can review the TAC Agenda at https://github.com/orgs/lf-energy/projects/2/views/1

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APPENDIX

Marketing/PR/Events Updates

LF ENERGY

Marketing and PR Updates

- Webinars
  - OpenDSM webinar scheduled for 24 September
- Project News
  - OpenSynth: beyond demand data
  - LF Energy Power Grid Model v1.12.0 Released: Enhanced State Estimation and Improved Observability
  - LF Energy OpenDSM Completes Development of New Hourly Model
- Content
  - PowSyBl security audit was published on July 30
- Use this form to submit any comms/marketing support requests
- See media coverage spreadsheet or website for recent articles

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Upcoming Events

- LF Energy Summit Europe
  - Sept 10-11 – Aachen, Germany
  - Confirmed to be the biggest LFE Summit yet!
  - https://events.linuxfoundation.org/lfenergysummit/
- LF Energy Summit North America
  - Oct 3, 2025 – Montréal, Québec
  - https://events.linuxfoundation.org/lfenergysummit-north-america/
- OSPOlogy Live France
  - Nov 5-6 (tentative) - Lyon, France
  - Hosted by RTE
  - This is actually organized by the TODO Group in partnership with LF Energy.
  - Goal: educate utilities and other energy stakeholders on open source best practices
  - Looking for a few more speakers for these sessions:
    - Cross-Border Collaboration in Energy Innovation. What's Next
    - Open Source Management Tooling to advance digitalization of the energy industry
  - https://community.linuxfoundation.org/events/details/lfhq-ospology-european-chapter-presents-ospologylive-lyon/

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Upcoming Event CFPs

Europe

- Energy Tech Summit - April 15-16 - Bilbao - Speaking submissions due September 29
- CIRED - June 9-10 - Brussels - Speaking submissions open on 10 September; close 1 December