Technical Advisory Council (TAC) Meeting

26 September 2023

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Meeting information

- Meeting to begin at 5:00 pm Central European Time
- Join the meeting by going to https://zoom-lfx.platform.linuxfoundation.org/meeting/95214651568?password=eda16f17-bdd1-4a9f-a594-0947a1433153
- 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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Agenda

All Times in Central European Time Zone

- 5:00 pm - 5:15 pm - Opening and General Updates
  - TAC and Project lead updates
  - Project Review Cycle
  - General Updates
- 5:15 pm - 5:30 pm - G.R.I.P Alliance Proposal
- 5:30 pm - 5:50 pm - GXF Annual Review
- 5:50 pm - 6:10 pm - AI Working Group Proposal
- 6:10 pm - 6:25 pm - Marketing/PR/Events updates
- 6:25 pm - 6:30 pm - Closing and Next Meeting

Opening and General Updates

5:00 pm - 5:15 pm

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TAC Voting Members

You can update your headshot/title at openprofile.dev.

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Antonello Monti

Chair

Professor

RWTH Aachen University

Anne Tilloy

Project manager

RTE (Reseau de Transport dElectricite)

Art Pope

Member of Technical Staff at Google LLC

Avi Allison

Program Manager, Energy, Sustainability

Microsoft Corporation

Boris DOLLEY

Director of Sustainable IT Strategy

RTE (Reseau de Transport dElectricite)

Bryce Bartmann

Chief Digital Technology Advisor

Shell International Petroleum Company

Jonas van den Bogaard

Open Source Office Lead

Alliander

Maarten Mulder

PO Field Device Platforms

Alliander

Travis Sikes

Senior Data Scientist

Recurve

LF Energy Hosted Project and Working Group Leads

Changes in bold

Project	Project Lead(s)
PowSyBI	Anne Tilloy, RTE
OperatorFabric	Frederic DIDIER, RTE
OpenEEmeter	Travis Sikes, Recurve
GXF	Maarten Mulder, Alliander
SOGNO	Antonello Monti, RWTH Aachen University
CoMPAS	Aliou Diaite, RTE & Sander Jansen, Alliander (TAC Representative)
FledgePOWER	Akli Rahmoun, RTE
Hyphae	Asimenia Korompili, RWTH Aachen University
openLEADR	Lonneke Driessen & Stan Janssen, OpenADR
SEAPATH	Éloi Bail, RTE
Grid Capacity Map	Per Lysemose Hansen, Energinet
Shapeshifter	**Robben Riksen, Alliander**
OpenSTEF	**Frank Kreuwel, Alliander**
EVerest	Marco Möller, PIONIX
OpenGEH	Per Lysemose Hansen, Energinet
FlexMeasures	Nicolas Höning, Seita Energy Flexibility B.V.
Arras	David Chassin, SLAC
Dynawo	Marco Chiaramello, Benoît Jeanson, RTE
OpenFIDO	David Chassin, SLAC
Power Grid Model	Tony Xiang, Alliander
Real Time Data Ingestion Platform (RTDIP)	Bryce Bartmann, Shell

Project Review Cycle

Working Groups				
Group	Current Level	Initially Accepted	Last Review	Next Review
Archimate Working Group	**Active**	**October 4, 2022**		**October 17, 2023**

2024 Future Reviews

Project	Current Level	Initially Accepted	Last Review	Next Review
OpenFIDO	Sandbox	January 17, 2023		January 9, 2024
SEAPATH	Incubation	October 6, 2020	January 17, 2023	January 9, 2024
Hyphae	Incubation	December 8, 2020	February 7, 2023	February 20, 2024
Power Grid Model	Sandbox	February 7, 2023		February 20, 2024
FledgePOWER	Incubation	February 11, 2021	March 21, 2023	March 12, 2024
SOGNO	Early Adoption	October 27, 2020	March 21, 2023	March 12, 2024
Shapeshifter	Incubation	April 6, 2021	April 11, 2023	April 23, 2024
CoMPAS	Incubation	May 5, 2020	July 13, 2022	June 25, 2024
Arras	Sandbox	July 12, 2022	July 25, 2023	January 30, 2024
OperatorFabric	Early Adoption	April 30, 2019	July 25, 2023	July 16, 2024
TROLIE	Incubation	September 5, 2023		September 3, 2024
Battery Data Alliance	Incubation	September 5, 2023		September 3, 2024

2023 Upcoming Reviews

Project	Current Level	Initially Accepted	Last Review	Next Review
~~GXF~~	~~Early Adoption~~	~~February 4, 2020~~	~~October 4, 2022~~	~~September 26, 2023~~
Grid Capacity Map	**Incubation**	**April 27, 2021**	**July 12, 2022**	**October 17, 2023**
OpenEEmeter	**Incubation**	**June 4, 2019**	**September 13, 2022**	**October 17, 2023**
OpenGEH	**Sandbox**	**October 12, 2021**	**October 4, 2022**	**October 17, 2023**
RTDIP	Sandbox	October 25, 2022		November 7, 2023
OpenSTEF	Incubation	September 21, 2021	October 25, 2022	November 7, 2023
OpenLEADR	Incubation	September 15, 2020	December 6, 2022	November 7, 2023
FlexMeasures	Incubation	November 2, 2021	November 15, 2022	November 28, 2023
PowSyBl	Early Adoption	April 30, 2019	November 15, 2022	November 28, 2023
Dynawo	Sandbox	December 6, 2022		December 5, 2023
EVerest	Early Adoption	October 12, 2021	December 6, 2022	December 19, 2023

TAC Sponsors for Projects

As part of the benefit for LF Energy projects, the TAC has a sponsor for each project.

"Appointment of an existing TAC member by the TAC that will act as a sponsor of the project and provide recommendations regarding governance best practices."

ACTION: Review assignments, let John or Yarille know if there are issues

Project	Current Level	TAC Sponsor
Archimate Working Group	Working Group	Maarten Mulder
Arras	Sandbox	Antonello Monti
CoMPAS	Incubation	Bryce Bartmann
Dynawo	Incubation	Art Pope
EVerest	Early Adoption	Bryce Bartmann
FledgePOWER	Incubation	
FlexMeasures	Incubation	Maarten Mulder
Grid Capacity Map	Incubation	Boris Dolley
GXF	Early Adoption	Jonas van den Bogaard
Hyphae	Incubation	Antonello Monti
OpenEEmeter	Incubation	Travis Sikes
OpenFIDO	Sandbox	Avi Allison
OpenGEH	Sandbox	Avi Allison
OpenLEADR	Incubation	Anne Tilloy
OpenSTEF	Incubation	Jonas van den Bogaard
OperatorFabric	Early Adoption	Boris Dolley
PowSyBl	Early Adoption	Anne Tilloy
Power Grid Model	Sandbox	Jonas van den Bogaard
Real Time Data Ingestion Platform (RTDIP)	Sandbox	Art Pope
SEAPATH	Early Adoption	
Shapeshifter	Incubation	Jonas van den Bogaard
SOGNO	Early Adoption	Antonello Monti

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General Updates

- We'd like to schedule guest speakers/topics that would be of interest to TAC members and TSC leads.
  - **ACTION: Let us know what would be of interest at https://github.com/lf-energy/tac/issues/31.**
- Plan to move all projects to using LFX PCC Meeting Management by end of the year; current status at https://github.com/lf-energy/tac/issues/39
  - **ACTION: Volunteer to transition over.**
- Future of Slack; revisit looking at alternatives. Zulip has been suggested at https://github.com/lf-energy/tac/issues/48
  - **DISCUSSION: Revisit Slack and alternatives.**

G.R.I.P Proposal

5:15 pm - 5:30 pm

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GXF Annual Review

5:30 pm - 5:50 pm

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Annual Review for Grid eXchange Fabric

Maarten Mulder & Robert Tusveld - Alliander

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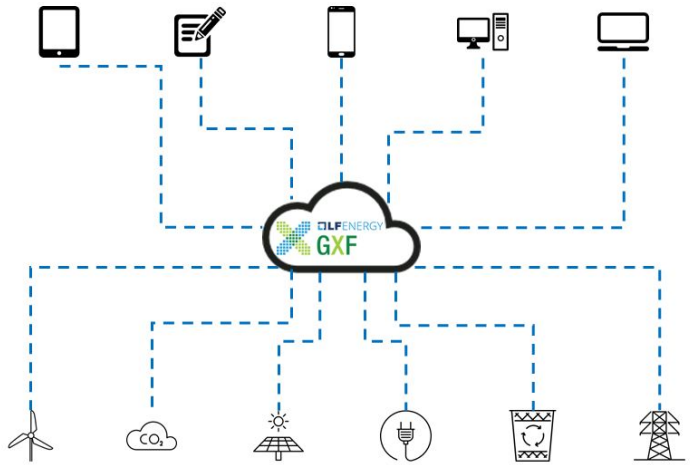
Grid eXchange Fabric

Grid eXchange Fabric (GXF) is a software platform that enables hardware monitoring and control in the public space. GXF provides several functions out of the box and provides scalability & high availability, high security, a generic design, and no vendor lock-in. GXF is currently deployed in several public use cases, including microgrids, smart metering, public lighting, and distribution automation.

GXF is open, independent, and driven by its community, developed using open-source best practices and designed to use open standards. This enables third parties to develop new and innovative solutions. The trade-off is flexibility and freedom. Unlike closed proprietary software, open-source software can be altered and extended by any developer familiar with the source code. This grants organizations freedom from "vendor lock-in," assures long-term viability, and creates industry opportunities for support, consulting, and training.



Mission: The platform to connect with any digital device to collect data and support functions.

Scope: To communicate with digital devices in the business-critical security zone.

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Past year

- Stable contributor strength
- Stable comits growth

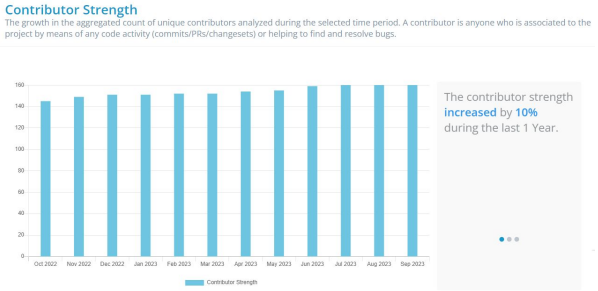
- Ambition make a step in the direction of the Graduation Stage
- To busy with infrastructure changes

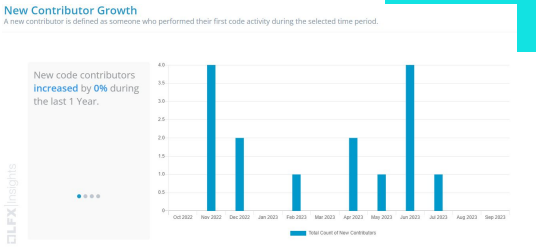
LFE summit 2023

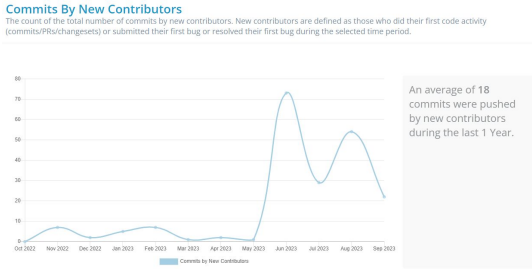
- Presentation about GXF use-cases

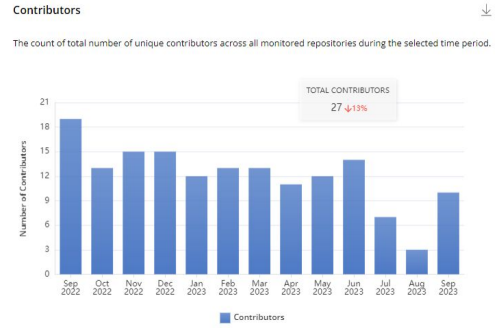
Incubation Project review criteria:

- License scan 3 (old) findings explained









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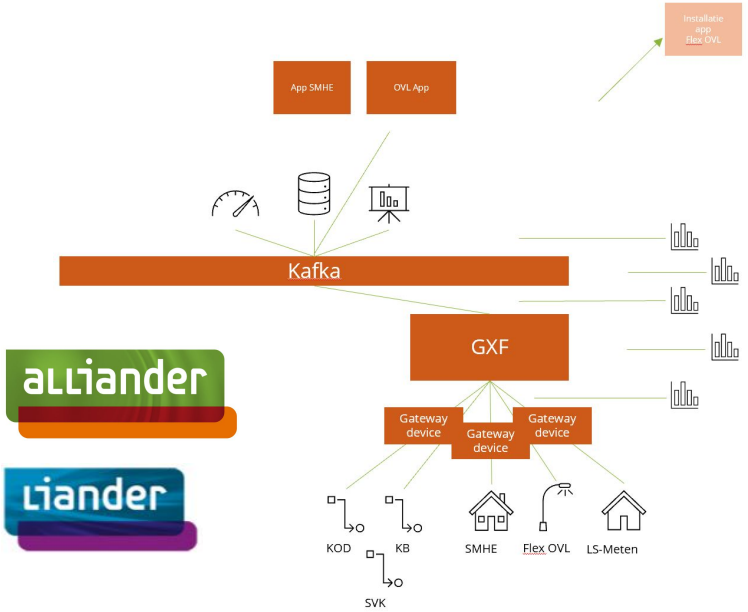
Organizations contributing and/or using in production

- Alliander is Maintainer and deliver the GXF solutions to Liander.
- At the moment there are no other users/contributors.
- Ongoing discussions with other DSOs to share code.



Key Achievements in the past year

LS-meten **600** devices in production

SMHE **5.000.000** devices in production

Flex ovl CI/CD ready container based **18.000** devices in production

POC for integrated battery powerd device (KOD/KB/SVK)

Next year

- Ambition make a step in the direction of the Graduation Stage.
- Developing new chains for distribution automation.
  - Cable oil pressure
  - Cathodic protection
  - Fault detection
- Technology improvements (security scan).
- Growth plan for coming years.

- Make front-end applications for Public Lighting Open Source.
- Improve documentation.

Early Adoption Project review criteria

- Demonstrate growth in the project's community
  - Stable contributor strength
  - Stable commits growth
- Technical Governance of the project is operational
  - Internal steering committee is in place
  - Achievement of the OpenSSF Best Practice badge at the 'Silver' Level
- Development of a growth plan, to be done in conjunction with their project mentor(s) at the TAC.
  - The release plan depends on the roadmap and future plans of Alliander.
  - Growth plans focus on the target end-users in the Dutch DSO industry.
  - Identification of any regulatory or standards body requirements for deployment, and plans for implementation. (Alliander OSPO/Alliander Mission Control)
  - Plans for growth of project contributors and committers to support the growth plan. Make frond-end applications open source for the different solutions.
  - Identification of any infrastructure resources needed to fulfill the growth plan. ?

>> For now, our proposal is to remain in the early adoption stage for the coming year.

Areas the project could use help on

- We could use assistance with reviewing documentation.
- More focus on using easy language on website and documentation.
  - We will explain our functional use cases better.

Feedback on working with LF Energy

- It's good to see the community is growing. Well done!

- The Roadmap link: GXF Roadmap - LF Energy - LF Energy does not work
- The link https://wiki.lfenergy.org/display/GEF Should be https://wiki.lfenergy.org/display/GXF

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AI Working Group

5:50 pm - 6:10 pm

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AI for energy systems - SPI proposal

TAC meeting - September 26th 2023

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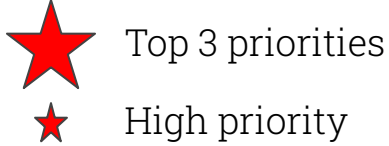
AI for energy systems use cases



AI assistants

Grid Interactive Smart Communities	Demand scheduling and flexibility	Intelligent power plant operations	Asset management and reliability	Environmental impacts and resiliency	Long term planning	Optimized designs

Forecasting supply and demand

Accelerated optimization and simulation

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LF Energy board strategic priorities of AI

- **Availability of datasets**
  - Share available data from members
  - Landscape of high quality datasets available
  - Produce, host & maintain high quality benchmark datasets based on real grid data and generative AI / data obfuscation

- **Open commons for AI buildings blocks, focusing on high priorities uses cases**
  - Forecasting : leverage OpenSTEF framework & sharing of AI forecasting techniques
  - Asset management : predictive maintenance, anomaly detection, etc…
  - Optimization (optimal dispatch) and AI speed-up techniques
  - Power System specialized LLM

- **Sharing of best practices, industry engagement and events**

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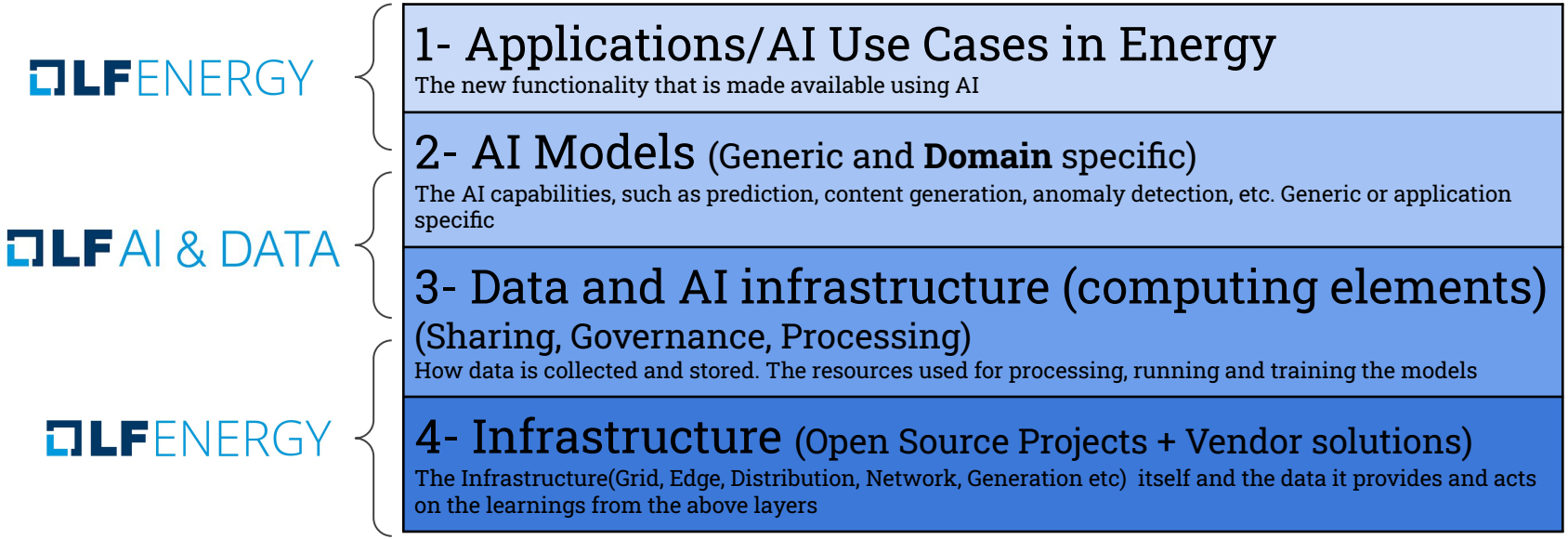
In collaboration with LF AI & Data



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Proposal : form a Special Interest Group

- **Objectives :**
  1. Share information & pool resources on make high quality dataset available for AI energy use cases
  2. Share work/issues of common interests on AI and look for joint project opportunities
  3. Share best practices on AI governance & ethics
  4. Together with MAC, identify / organize events on AI and energy systems

- **Meetings every 1-2 months**

- **Participants : A. Parisot (Lead) + AI experts from members**

- **Leverage other initiatives like EPRI.AI, ClimateChangeAI, NSF AI institutes, IEEE WGs, etc…**

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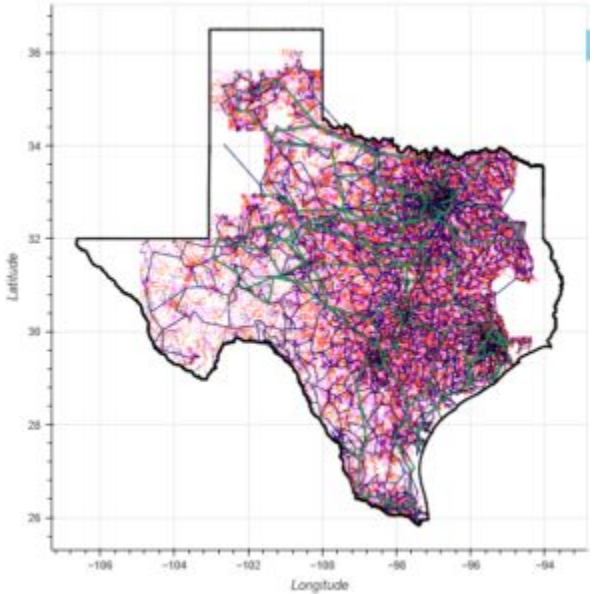
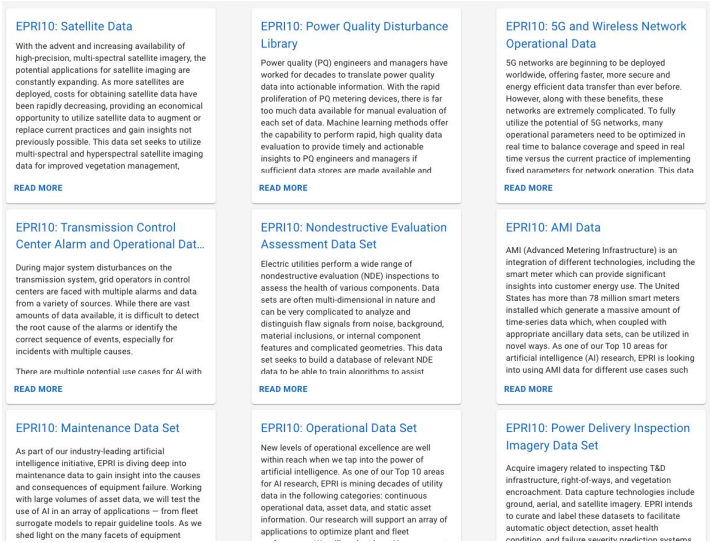
Open benchmarks for AI energy applications



https://electricgrids.engr.tamu.edu/



EPRI10: Satellite Data

With the advent and increasing availability of high-precision, multi-spectral satellite imagery, the potential applications for satellite imaging are constantly expanding. As more satellites are deployed, costs for obtaining satellite data have been rapidly decreasing, providing an economical opportunity to utilize satellite data to augment or replace current practices and gain insights not previously possible. This data set seeks to utilize multi-spectral and hyperspectral satellite imaging data for improved vegetation management,

READ MORE

EPRI10: Power Quality Disturbance Library

Power quality (PQ) engineers and managers have worked for decades to translate power quality data into actionable information. With the rapid proliferation of PQ metering devices, there is far too much data available for manual evaluation of each set of data. Machine learning methods offer the capability to perform rapid, high quality data evaluation to provide timely and actionable insights to PQ engineers and managers if sufficient data stores are made available and

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EPRI10: 5G and Wireless Network Operational Data

5G networks are beginning to be deployed worldwide, offering faster, more secure and energy efficient data transfer than ever before. However, along with these benefits, these networks are extremely complicated. To fully utilize the potential of 5G networks, many operational parameters need to be optimized in real time to balance coverage and speed in real time versus the current practice of implementing fixed parameters for network operation. This data

READ MORE

EPRI10: Transmission Control Center Alarm and Operational Dat...

During major system disturbances on the transmission system, grid operators in control centers are faced with multiple alarms and data from a variety of sources. While there are vast amounts of data available, it is difficult to detect the root cause of the alarms or identify the correct sequence of events, especially for incidents with multiple causes.

There are multiple potential use cases for AI with

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EPRI10: Nondestructive Evaluation Assessment Data Set

Electric utilities perform a wide range of nondestructive evaluation (NDE) inspections to assess the health of various components. Data sets are often multi-dimensional in nature and can be very complicated to analyze and distinguish flaw signals from noise, background, material inclusions, or internal component features and complicated geometries. This data set seeks to build a database of relevant NDE data to be able to train algorithms to assist

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EPRI10: AMI Data

AMI (Advanced Metering Infrastructure) is an integration of different technologies, including the smart meter which can provide significant insights into customer energy use. The United States has more than 78 million smart meters installed which generate a massive amount of time-series data which, when coupled with appropriate ancillary data sets, can be utilized in novel ways. As one of our Top 10 areas for artificial intelligence (AI) research, EPRI is looking into using AMI data for different use cases such

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EPRI10: Maintenance Data Set

As part of our industry-leading artificial intelligence initiative, EPRI is diving deep into maintenance data to gain insight into the causes and consequences of equipment failure. Working with large volumes of asset data, we will test the use of AI in an array of applications — from fleet surrogate models to repair guideline tools. As we shed light on the many facets of equipment

EPRI10: Operational Data Set

New levels of operational excellence are well within reach when we tap into the power of artificial intelligence. As one of our Top 10 areas for AI research, EPRI is mining decades of utility data in the following categories: continuous operational data, asset data, and static asset information. Our research will support an array of applications to optimize plant and fleet

EPRI10: Power Delivery Inspection Imagery Data Set

Acquire imagery related to inspecting T&D infrastructure, right-of-ways, and vegetation encroachment. Data capture technologies include ground, aerial, and satellite imagery. EPRI intends to curate and label these datasets to facilitate automatic object detection, asset health condition, and failure severity prediction systems

https://www.epri.com/thought-leadership/artificial-intelligence/data-sets

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Forecasting supply and demand

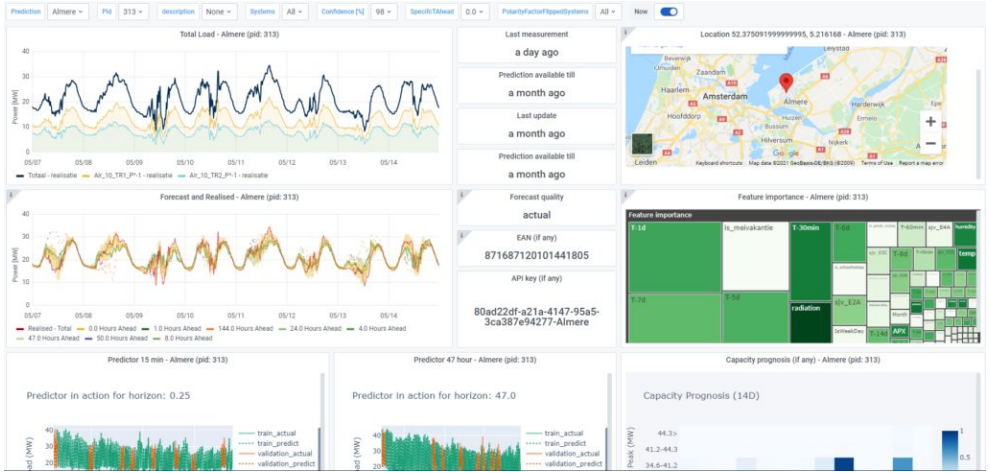
LF ENERGY OpenSTEF

pjm

Load Forecast at PJM

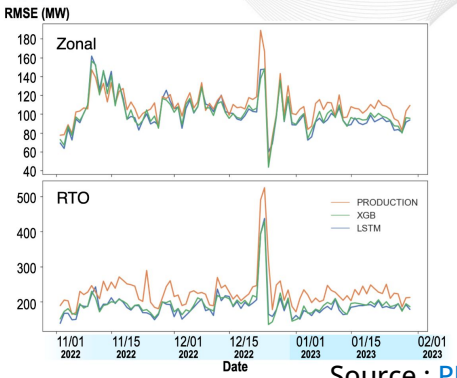
Short-Term Forecast (Hourly):	Very Short-Term Forecast (5-Minute):
Looks seven-days ahead	• Looks six-hours ahead • Used by Security Constrained Economic Dispatch (SCED)

Load forecasting is complex, dynamic and an important part of PJM's mission to supply reliable electricity to the 65 million people in the PJM region.



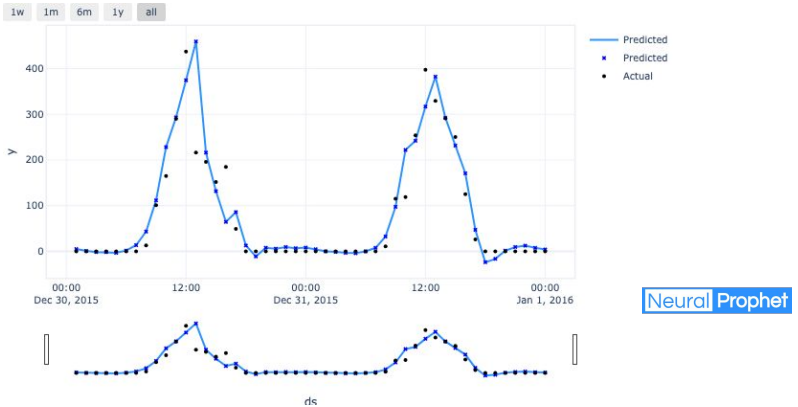
pjm

Results: RMSE by Day 2022–2023 Winter



- The tested models performed similarly across the test period from 2021 to 2023.
- Only 2022–2023 winter, and XGB and LSTM are shown for clarity.
- The tested models produced better forecast consistently compared to production.

Source : [PJM (at 2023 FERC software conf)]



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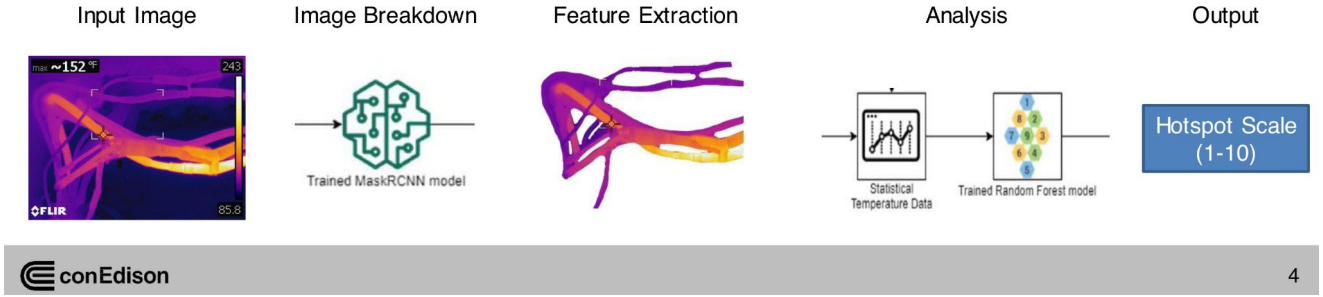
Asset management and reliability

Figure 1 . Samples from the BGI dataset

Source (CC BY 4.0) :
https://github.com/phd-benel/VPMBGI



Source : EPRI.AI Aug 22 workshop

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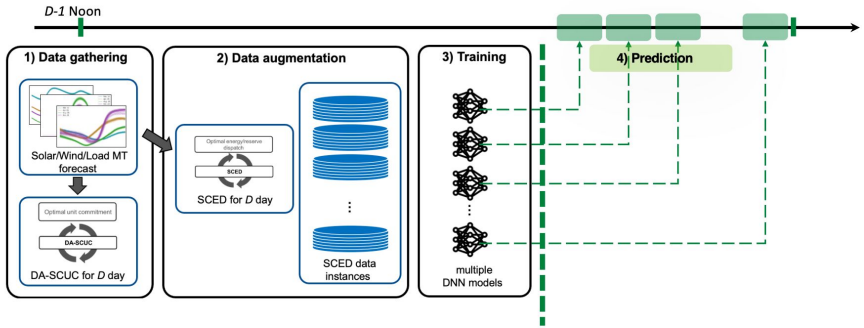
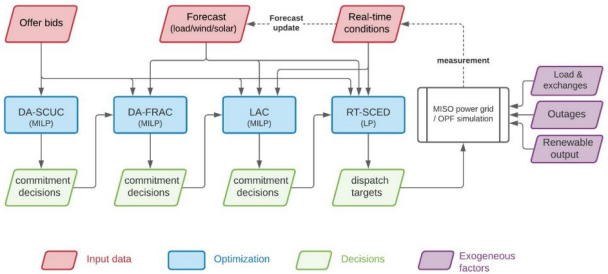
AI accelerated optimization and simulation

Just-in-Time Learning Pipeline



MISO Market Clearing Pipeline



RAMC Risk-Aware Market Clearing Project

MISO

Georgia Tech

AI Institute for Advances in Optimization

National Science Foundation

Source : Ai4opt NSF AI institute

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Marketing/PR/Events Updates

6:10 pm - 6:25 pm

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Marketing and PR Updates

dbrown@linuxfoundation.org
+1 415-420-7880

- Grants
  - Partnering with consortium organized by Anto to apply for an EU Horizon grant - application due early October
  - Submitting application for Ford Foundation grant this week - topic is a research paper on open source AI for energy
  - Tentatively approved for Natural Resources Canada grant to produce a report on what Canadian utilities need to do to meet the goals of the energy transition - currently going through due diligence
- Work continuing on cybersecurity for energy systems white paper
  - Dan has seen early draft and provided some feedback; review copy should be ready soon
- Recent media coverage
  - TFIR - OpenSTEF: Forecasting The Load On An Energy Grid
  - Power Electronics - Developments in Power Grid Operations with Linux Foundation's CoMPAS
  - CodeZine (Japan) - エネルギー業界のデジタル化状況は？　日本語版「2023 エネルギー トランスフォーメーション準備状況」をLF Energyが公開
  - TFIR - Meet Pranav Myana, The Visionary Recipient Of Shuli Goodman Memorial Fund
  - TFIR - How Open Source Is Helping Fight Climate Change | Jonas van den Bogaard
  - ERP Today - Linux Foundation Energy powers-up & opens wider
  - EnergyPortal.eu - LF Energy Announces Recent Momentum in Decarbonization Efforts
  - Renewable Energy Magazine - Linux Foundation Energy announces new software releases, research and deployments
  - TechZine.eu - Open Source Summit Europe 2023: Defined structures & diversified industries
- Use this form to submit any comms/marketing support requests

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Marketing and PR Upcoming Activities

- Linux Foundation annual report
  - LF Energy to be prominently highlighted
- Developing Seeed ReCharger case study with EVerest project (jointly with LF Zephyr project which is also used in the product)
- Submitted RTDIP for OpenUK Awards program
- Develop plan for engagement with standards bodies (IEC, IEEE, etc.)

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Events

- OpenUK Open Source for Sustainability Day - 14 Sept, Edinburgh
  - Dan spoke about the three recent research reports
- LF Europe Member Summit - 18 Sept, Bilbao
  - LF Energy hosted a table at the event - multiple new member prospects were generated
  - Lucian presented plenary session on LF Energy momentum
- SustainabilityCon at Open Source Summit Europe - 19-21 Sept, Bilbao
  - Hosted four sessions:
    - Panel: How Open Source Collaboration is Transforming the Power Systems Sector
    - Session: More Renewable Energy Into the Power Grid with Open Source
    - Session: SEAPATH: A LF Energy Project for Critical Infrastructure with an Emphasis on Software Supply Chain Security
    - Panel: Advancing the United Nations Sustainable Development Goals through Open Source
  - Generated multiple new member prospects
- LF Energy Summit 2024
  - Subcommittee met with LF Events team on 5 September
  - Discussions continue around dates, location, theme, format - more to come soon
- FOSDEM 2024 - 3-4 Feb, Brussels
  - Planning committee met today - devroom proposal in process and will be submitted ahead of 18 Oct deadline
  - Also plan to partner with LF Europe on an application to host a stand at the event
- Event tracker - please review and add any additional opportunities

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Upcoming Event CFPs

- Enlit Europe - Nov 28-30 - Rolling submission deadline
- e-world Energy & Water - Feb 20-22, 2024 - Rolling submission deadline
- Carbon Tracking & Reporting - March 26-27, 2024 - Rolling submission deadline
- Energy Thought Summit - April 15-18, 2024 - Rolling submission deadline
- CIRED Vienna - June 19-20, 2024 - Submissions open Sept 11, close Dec 8
- MOVE London - June 19-20, 2024 - Rolling submission deadline (for this one, we should email cormac.martin@terrapinn.com with speaking proposals)

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KPIs to Demonstrate Progress

We would like to start measuring and reporting on some KPIs that would help us demonstrate LF Energy's impact, but currently lack requisite data:

- Number of implementations
- Case studies demonstrating measurable benefits from implementations (e.g. reduction in emissions)
- Progress on digital transformations driven by LF Energy projects within utilities
- Others?

What ideas does this group have for sourcing this data?

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Closing and Next Meeting

6:25 pm - 6:30 pm

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Next TAC Meeting

The next meeting of the LF Energy TAC is scheduled for 17 October 2023 at 8:00 am US Pacific Time/11:00 am US Eastern Time/5:00 pm Central European Time. Agenda will include:

- Annual Review - Grid Capacity Map #6
- Annual Review - OpenEEmeter #7
- New Project Proposal - Open Sustainable Technology #42
- Review OpenSSF Badge Status #10
- Security audits for Early Adoption projects through OSTIF #11
- LFX Security for LF Energy projects #13
- Develop security strategy for LF Energy project #14
- 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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