

Technical Advisory Council (TAC) Meeting

29 October 2024

OLFENERGY

Meeting information

- Meeting to begin at 4:00 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>

Antitrust Policy Notice

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.

Agenda

All Times in Central European Time Zone

- 4:00 pm - 4:10 pm - Opening and General Updates
 - TAC member updates and project review date reminders
 - General updates
 - Project Security Focus updates
 - TAC Evolution Plan Update
- 4:10 pm - 4:30 pm - GridFM Presentation
- 4:30 pm - 4:50 pm - AI SIG Annual Review
- 4:50 pm - 5:10 pm - Archimate SIG Review
- 5:10 pm - 5:25 pm - Marketing/PR/Events updates
- 5:25 pm - 5:30 pm - Closing and Next Meeting

Opening and General Updates

4:00 pm - 4:10 pm

OLFENERGY

TAC Voting Members

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



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.



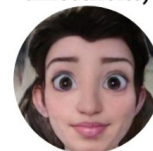
Clément Bouvier
Software engineer
RTE (Reseau de
Transport
dElectricite)



**Jonas van den
Bogaard**
Open Source Office
Lead
Alliander



Maarten Mulder
PO IoT Field Device
Platforms
Alliander



Sophie Frasnedo
Software developer
RTE (Reseau de
Transport
dElectricite)



Travis Sikes
Data Science
Manager
Recurve



Yixing Xu
Senior Program
Manager, Energy
Strategy
Microsoft
Corporation

LF Energy Projects

OLFENERGY

SIG - Digital Substations (3)



SIG - EV Charging (2)



SIG - Grid Operations (8)



SIG - Grid Simulation and Modeling (8)



SIG - Data Standards and Tooling (6)



LF Energy Hosted Project Leads

Project	Project Lead(s)
Arras	David Chassin
Battery Data Alliance	Gabe Hege, AMPLabs
CitrineOS	Thana Paris, S44
CoMPAS	Pascal Wilbrink Alliander & Sander Jansen, Alliander (TAC Representative)
covXtreme	Sachin Bhakar, Shell
Dynawo	Marco Chiaramello, Benoît Jeanson, RTE
EVerest	Marco Möller, PIONIX
FledgePOWER	Romain Lebrun-Thauront, RTE
FlexMeasures	Nicolas Höning, Seita Energy Flexibility B.V.
Grid Capacity Map	Harald Klomp, Vattenfall
GRIP	Alyona Teybar, MASc

Project	Project Lead(s)
GXF	Maarten Mulder, Alliander
Hyphae	Arila Barnes
InterConnect SIF	Milenko Tomic, VizLore Labs
NODE Collective	DeAndrea Salvador
OneNet Framework	
OpenDSM	Travis Sikes, Recurve
OpenFIDO	David Chassin, SLAC
OpenGEH	Nicolas Bernhardt, Energet
OpenLEADR	Hugo van de Pol, Arila Barnes
OpenSTEF	Frank Kreuwel, Alliander
OpenSynth	Gus Chadney, Centre for Net Zero

Project & Working Group Leads

Project	Project Lead(s)
OperatorFabric	Frederic DIDIER, RTE
Power Grid Model	Tony Xiang, Alliander
PowSyBI	Anne Tilloy, RTE
Real Time Data Ingestion Platform (RTDIP)	Bryce Bartmann, Shell
SC Decarbonisation Hub	Sachin Bhakar, Pedram Muurlink
SEAPATH	Éloi Bail, Savoir-faire Linux
Shapeshifter	Robben Riksen, Alliander
SOGNO	Antonello Monti, RWTH Aachen University (TAC Representative) & Fito Galeano, RWTH Aachen University

SIG / Working Group	Work Group Lead(s)
AI SIG	Alexandre Pariost, The Linux Foundation
Archimate SIG	Jonas van den Bogaard, Alliander
ORES (Open Renewable Energy Systems)	Chris Xie, Futurewei

New Project Review Cycle

Grid Operations SIG - Mtgs every other month, 3rd Wednesday				
Project	Current Level	Initially Accepted	Last Review Date	Next Review Date
FlexMeasures	Incubation	2022-01-05	2023-11-28	2024-11-20
RTDIP	Sandbox	2024-06-04	2024-01-30	2025-01-15
SOGNO	Early Adoption	2021-03-11	2024-04-23	2025-03-19
Shapeshifter	Incubation	2021-10-04	2024-05-14	2025-05-21
FledgePower	Incubation	2021-02-16	2024-06-04	2025-05-21
OperatorFabric	Early Adoption	2019-04-30	2024-07-16	2025-07-16
OpenLEADR	Incubation	2021-08-03	2021-11-23	2025-09-17
GXF	Early Adoption	2020-02-04	2024-09-18	2025-09-17

EV Charging SIG - Monthly, 4th Wednesday				
Project	Current Level	Initially Accepted	Last Review Date	Next Review Date
CitrineOS	Sandbox	2023-11-28		2024-11-27
EVerest	Early Adoption	2021-10-12	2024-01-09	2025-01-22

Digital Substations - Monthly, 2nd Tuesday				
Project	Current Level	Initially Accepted	Last Review Date	Next Review Date
Seapath	Early Adoption	2020-10-06	2023-12-19	2024-12-10
FledgePOWER	Incubation	2021-02-11	2024-06-04	2025-05-13
CoMPAS	Incubation	2020-05-05	2024-06-25	2025-06-10

New Project Review Cycle

Grid Simulation and Modeling - Mtgs every other month, 1st Wednesday				
Project	Current Level	Initially Accepted	Last Review Date	Next Review Date
PowSyBl	Early Adoption	2019-04-30	2023-11-28	2024-12-04
OpenSTEF	Incubation	2021-09-21	2023-11-07	2025-02-05
Power Grid Model	Sandbox	2023-02-07	2024-02-20	2025-02-05
covXtreme	Sandbox	2023-12-19		2025-04-02
Dynawo	Sandbox	2022-12-06	2024-01-30	2025-06-04
Arras	Sandbox	2022-07-12	2024-07-16	2025-09-03
Grid Capacity Map	Incubation	2021-04-27	2023-10-17	TBD
GRIP	Sandbox	2023-09-26		TBD

Data Standards and Tooling - Mtgs every other month, 2nd Thurs.				
Project	Current Level	Initially Accepted	Last Review Date	Next Review Date
OpenDSM	Incubation	2019-06-04	2024-09-17	2024-11-14
TROLIE	Working Group			2024-11-14
OpenSynth	Sandbox	2024-01-09		2025-01-09
Battery Data Alliance	Incubation	2023-09-05	2024-08-27	2025-07-10
SC Decarbonization Hub	Sandbox	2024-08-27		2025-09-11
CDSC	Working Group			TBD
Super Advanced Meter	Working Group			TBD

Projects in LF Onboarding

- [GridFM](#) - presenting today
- [GridCal](#) - working on rename and relicensing
- [python Emission Localization and Quantification \(pyELQ\)](#)

SIG Governance additions

Please review <https://github.com/lf-energy/tac/pull/278> that adds in the changes to the SIG Governance as discussed in the last TAC meeting.

- Common SIG Goals
- Annual Reviews
- Representative/voting model

GridFM Presentation

4:10 pm - 4:30 pm

OLFENERGY



GridFM: enable the emergence of foundation models for power grids

PRESENTED BY:

FRANÇOIS MIRALLÈS RESEARCHER

HYDRO-QUÉBEC

HENDRIK HAMANN

CHIEF SCIENCE OFFICER

IBM RESEARCH



OCTOBER 2024

Founding members



François Mirallès, Researcher
Hydro-Québec Research Center



Vincent Mai, Researcher
Hydro-Québec Research Center



Alexandre Blondin Massé, Researcher
Hydro-Québec Research Center



Hendrik Hamann, Chief Science
Officer
IBM Research

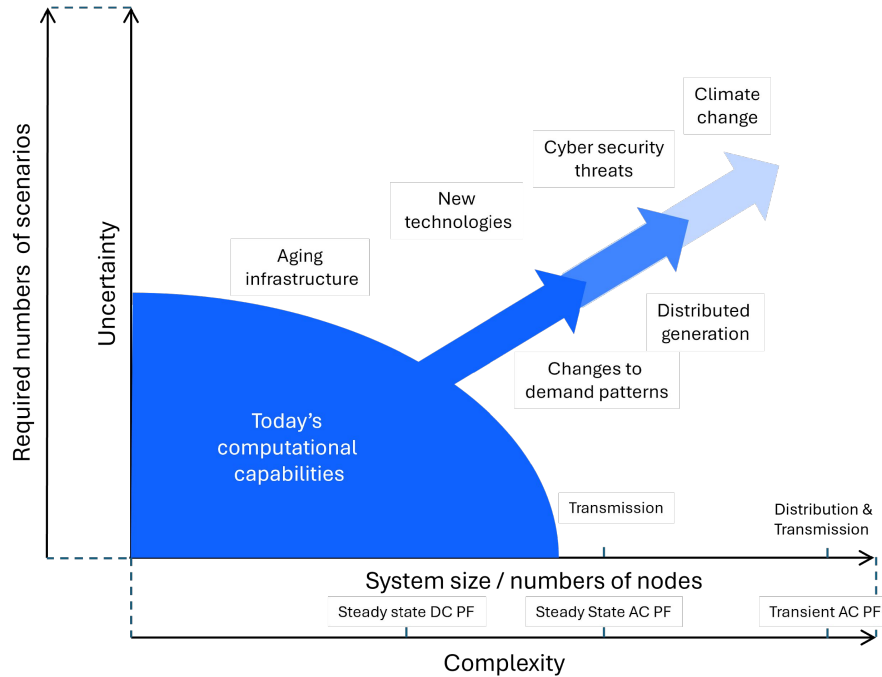


Jonas Weiss, Researcher
IBM Research



Thomas Brunswiler, Researcher
IBM Research

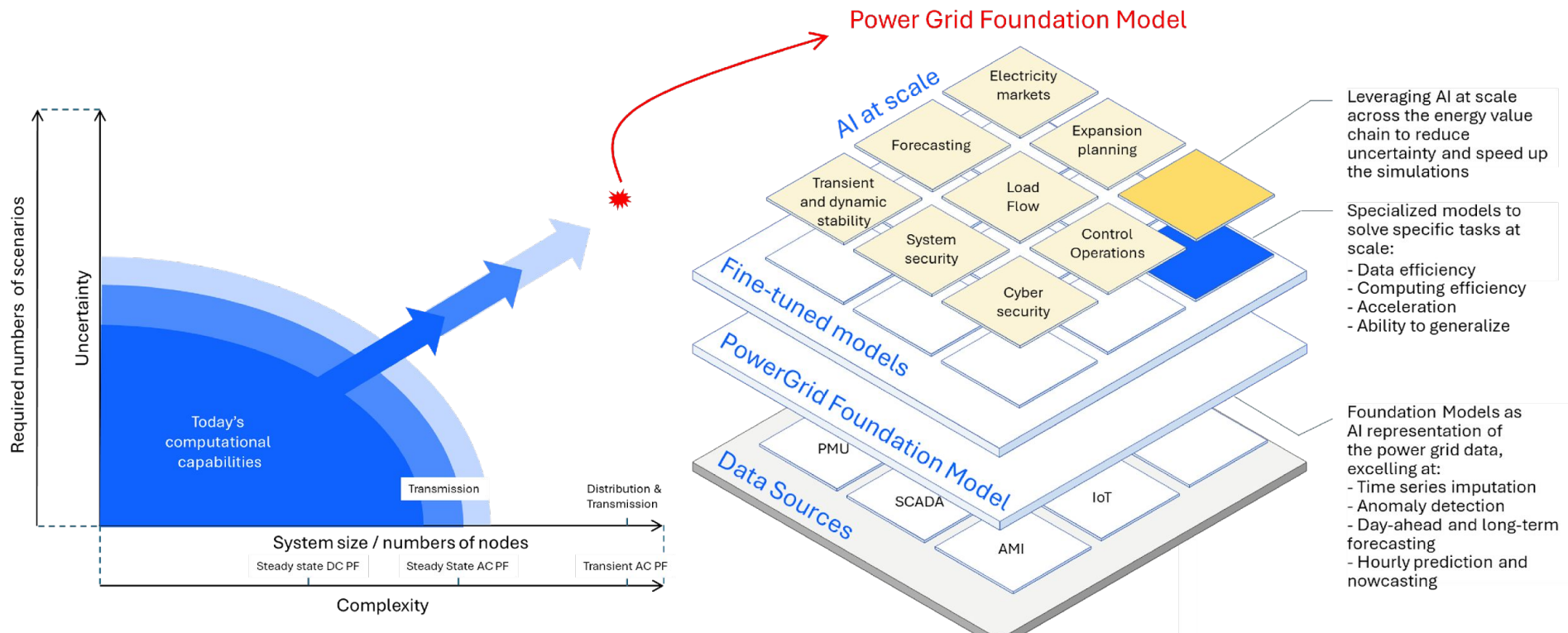
Challenges of future power grids



Structural changes to power grids brought by the energy transition lead to a higher uncertainty and complexity as well as variable grid inertia.

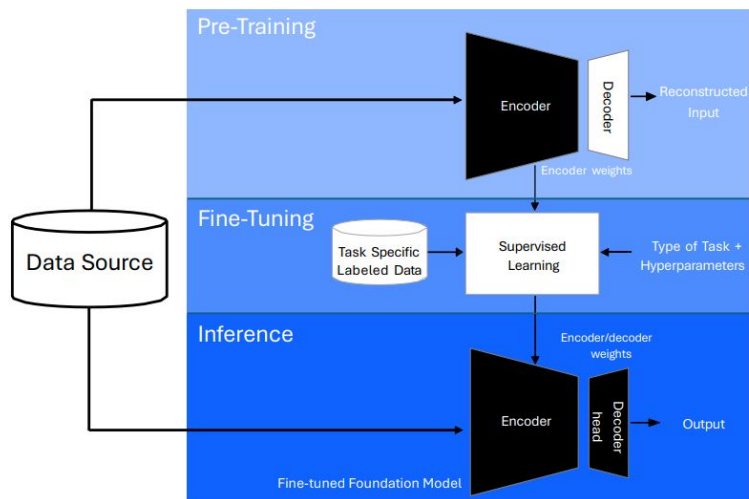
Higher computational capabilities are needed to cope with these structural changes.

GridFM: power grid foundation model

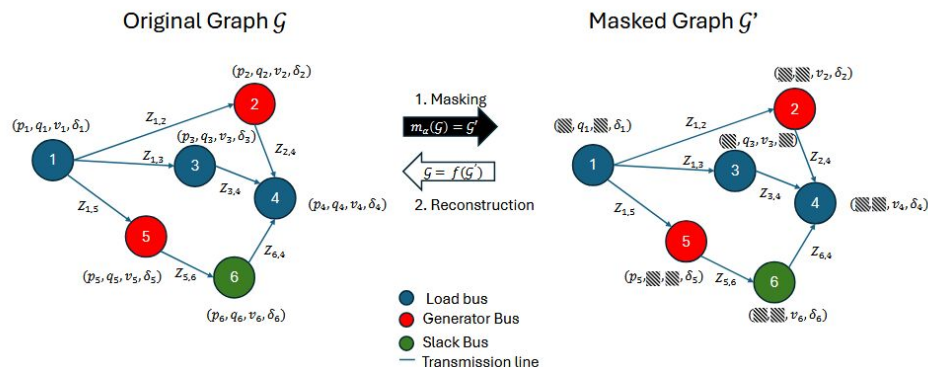


Anatomy of the GridFM

The three FM life-cycle phases



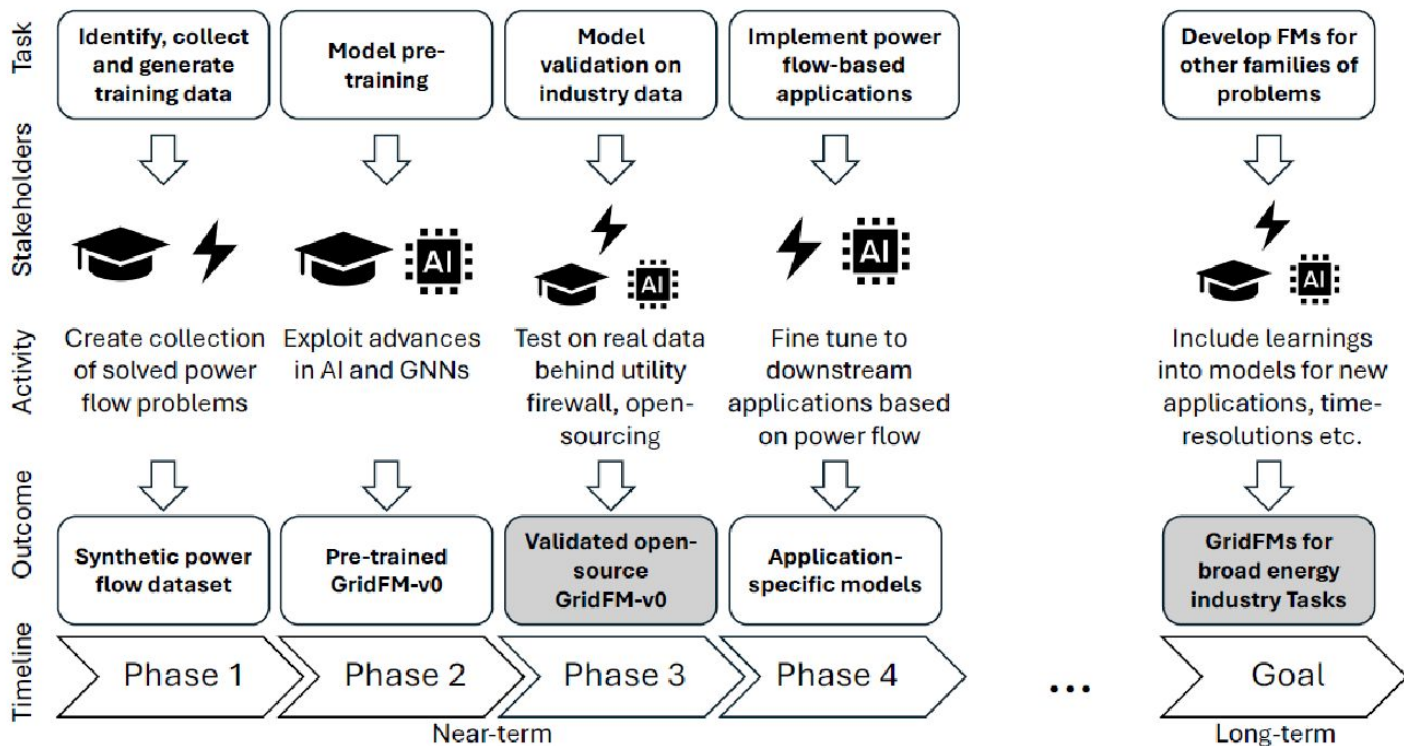
GridFM self-supervised pretraining



From H. Hamann et al. A Perspective on Foundation Models for the Electric Power Grid
<https://arxiv.org/abs/2407.09434>

From A. Puech, et al. *Optimal Power Grid Operations with Foundation Models*, <https://arxiv.org/abs/2409.02148>

GridFM development roadmap



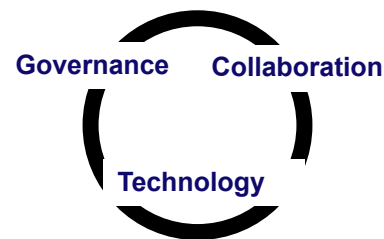
GridFM community

Goal:

Bring together stakeholders from industry and academia to study and evaluate the potential and impact of FMs for the electrical energy industry by:

- Collaborating through technological exchanges :
 - **Monthly meetings**
 - **Workshops:**
 - Feb. 12th 2024: IBM Research, Yorktown Heights, USA
 - June 15th 2024: Imperial College London, UK
 - *Upcoming:* Feb 13th 2025: Argonne National Lab, USA
- Investigating technical feasibility of GridFM.
- Increasing the stakeholder circle.
- Reaching out to governments and regulators to further enable GridFM.

Structured in working groups:



Initiator:



Industry:



Academia:



Government:



GridFM community and OSS framework

GridFM will greatly benefit from open collaboration



Utilities have data and operational experience.



IT companies have scalable compute power and AI expertise.



Academia and National Labs have a deep knowledge of electrical systems features and industrial use cases.

A call for collaboration:

“One foundation for all and all data for one”

Treat the encoder as a common good, as well as the infrastructure to use it (input/output/inference) and train it as part of a federated learning process.

The encoder can be implemented / trained for specific / internal needs but CANNOT be released / embedded outside the project and its license. This means adaptations to the encoder for specific uses must be contributed back unless it is a purely internal use.

Decoder applications can be open or proprietary. When proprietary, decoder side use cases enable business sustainability.

Why GridFM as a LFE project?

Alignment with LFE mission statement:

Licensing flexibility to maintain a good equilibrium between openness, scalability and business sustainability.



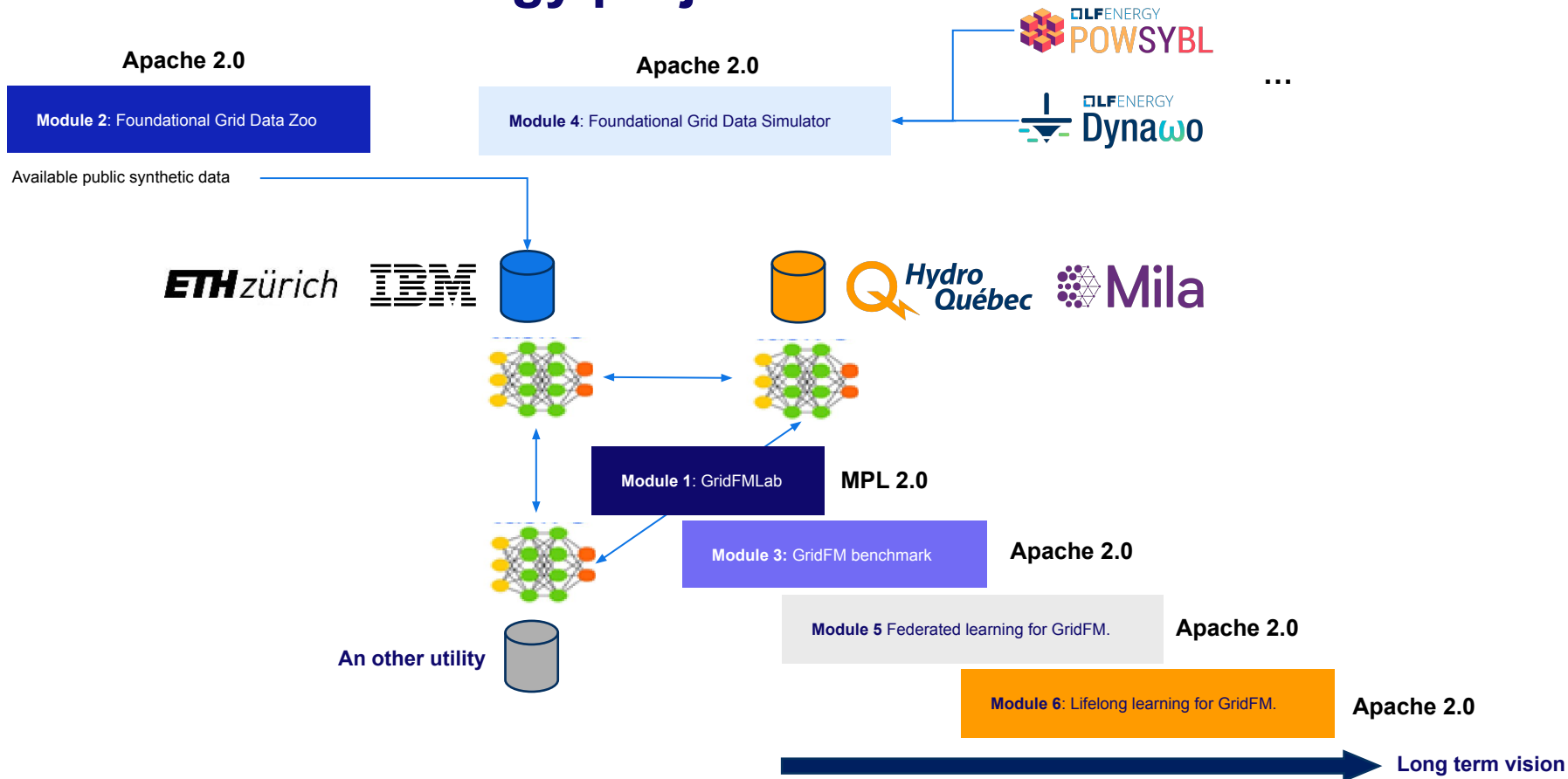
Leverage LF energy's expertise creating and growing open-source communities

..."creating a technology ecosystem to support rapid decarbonization that benefits the environment, enables economic prosperity, and leads to social well-being for future generations..."

From <https://lfenergy.org/about/why-lf-energy/>

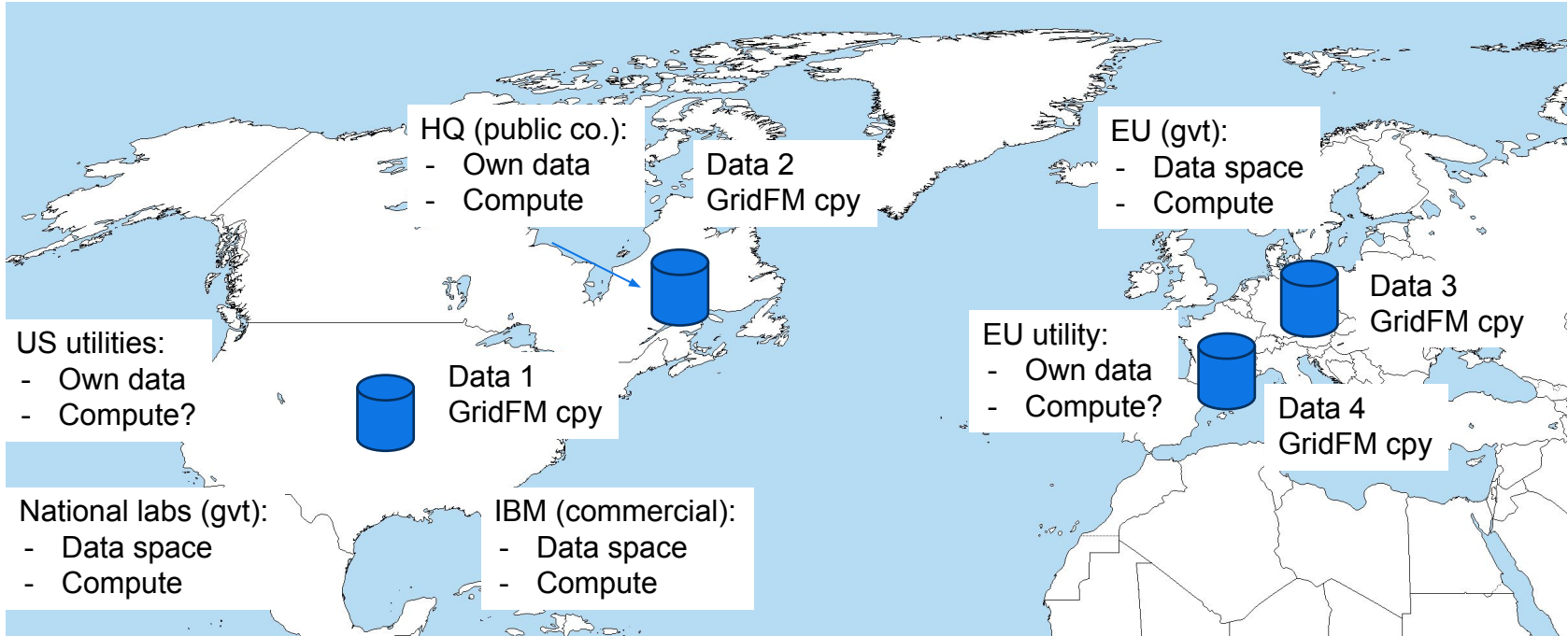
Scaling thanks to a neutral ground for frictionless collaboration

GridFM as a LFEnergy project



The long term vision

Data streams from different utilities update a GridFM in a distributed way, by jurisdiction:



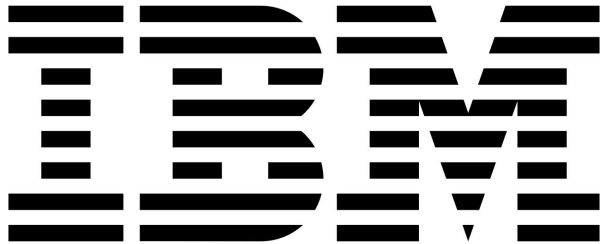
Next practical steps

- **Structure GridFM project in OSS framework**
- **Ramp up the activities of the technology working group:**
 - Data
 - Model Development
 - Cybersecurity and privacy
 - Model governance and trust
- **Strategy to grow a community**



Thanks for your consideration!

GridFM: enable the emergence of foundation models for power grids.



AI SIG Review

4:30 pm - 4:50 pm

OLFENERGY

AI Special Interest Group scope and priorities

- **Objectives :**

1. Share information & pool resources on making 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**

- **Leverage other initiatives like EPRI.AI, CCAI, NSF AI institutes, IEEE WG/TFs, etc...**

⇒ **Main goal is to align on initiatives / projects to launch**

AI priorities from board Sept 2023



Top 3 priorities



High priority

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



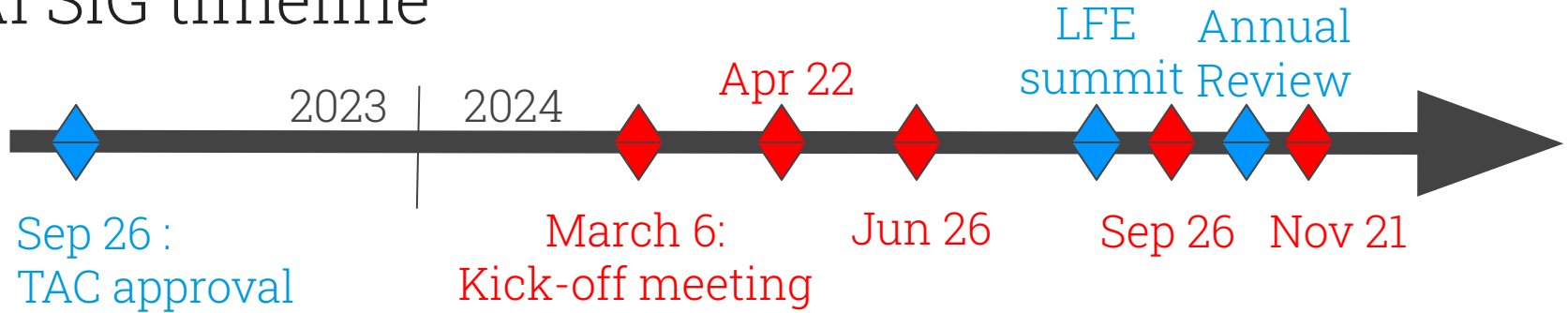
Forecasting supply and demand



Accelerated optimization and simulation

Data access, digital twins and realistic open benchmarks for AI innovation

AI SIG timeline



SIG participants



Projects / initiatives (1/2)

Forecasting



+ [Short term load forecasting tools/library by HydroQuebec](#)
(Presented at LF Energy Summit 2024)

Smart meter data



+ **Deployment in other regions ?**

Accelerated optimization

+ **Open benchmark for topology optimization studies based on real topology data from RTE**
+ **Leverage other initiatives around OPF research**

Foundational models

+ **GridFM = presented today**

Digital twins (for AI)

+ **Possible Digital Twin project under discussion**

Projects / initiatives (2/2)

LF Energy white paper on AI

Open is the key to AI in Energy Systems

Introduction

What is LF Energy?

Open is critical to AI adoption in the Energy Industry

- Open collaboration and innovation enables speed and scale
- Open source fosters transparency and trust for AI applications
- Open source strengthens privacy, cybersecurity and ethical safeguards
- Open frameworks help comply with AI regulations (ex. EU AI act)
- Open source helps attract, develop and focus talent

AI readiness for energy stakeholders

- From data access and governance to digital twins
- AI innovation in energy requires open realistic datasets
- Open commons and foundational models
- AI literacy and governance

Priority use cases for open source AI projects in energy

- Forecasting
- Accelerated simulation and optimization
- Asset management
- Long term planning

Initiatives to accelerate AI adoption in the energy sector

- Open datasets, synthetic data and open benchmarks
- Foundational models for power systems
- Digital twin platforms

Conclusion

v1 to be released in Q4

Industry events on AI and energy

ARTIFICIAL INTELLIGENCE (AI)
AND DIGITAL TRANSFORMATION (DX)
Electric Power Summit

January 7-9, 2025
Crowne Plaza Palo Alto

AI-Day for Power System Operations - CIGRE & WG C2.42

Lundi 18 novembre 2024, 10h-18h
RTE, La Défense, 7 C Place du DÔME, immeuble Window, Puteaux

Priorities for the AI SIG

- ❑ **Keep working on AI related open source projects based on interest and contributions from members**
 - ⇒ **Join the AI SIG or reach out to discuss ideas/priorities**
- ❑ **Access to energy data is a top priority to drive AI forward, and open tools and open benchmarks can help with confidential or sensitive data**
 - ⇒ **LF Energy is the best environment to drive this forward**
- ❑ **Promote open source to accelerate AI readiness and AI adoption, through publications and industry events**
 - ⇒ **Alignment on the white paper will be a key milestone**

ArchiMate SIG Review

4:50 pm - 5:10 pm

DLFENERGY

ArchiMate SIG Annual Review

Value thorough collaboration
29th October 2024

LF Energy ArchiMate Special Interest Group (SIG)



Our Goals:

- Create synergy between projects
- Create standard modeling practices
- For faster and cost-effective applications; reusing what exists and sharing efforts.
- Improved modularity, interoperability, evolution of projects and initiative.
- Technological and business model innovation.
- Access, through collaboration, to wider and more diverse skills and to a diversity of viewpoints,

Context

Energy transition is radically changing how we *generate, transmit, distribute and consume* energy.

Common examples include: Distributed renewable energy sources, Demand response products, Electric mobility, Third party smart services to the grid.

A new ecosystem of applications is growing to enable the above. In such an ecosystem, collaboration is *key* to enable value for all.

LF Architecture Group is at the forefront of this collaboration – making is *open and value-oriented*.



Application – Challenges



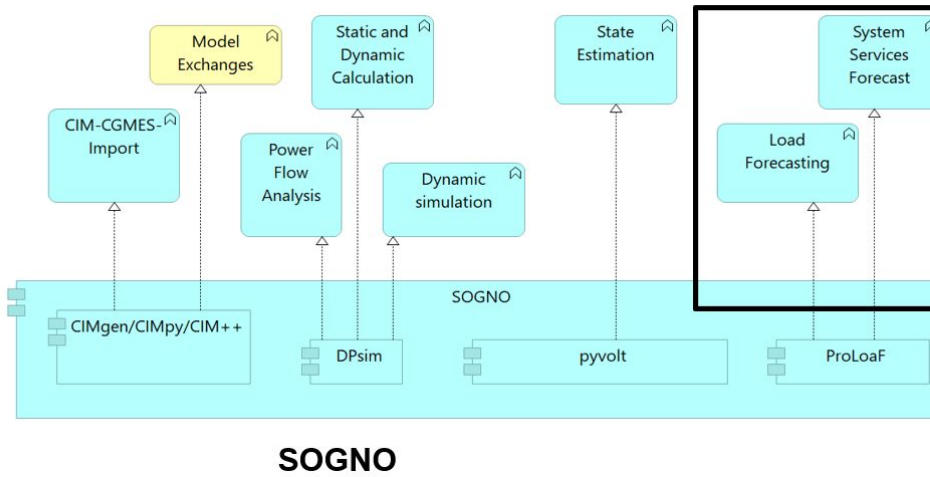
- Interoperability
- Modularity
- Upgradability
- Speed of innovation
- Cost-effectiveness (customization & scalability)
- Speed of innovation

Enabling value-oriented collaboration through architecture

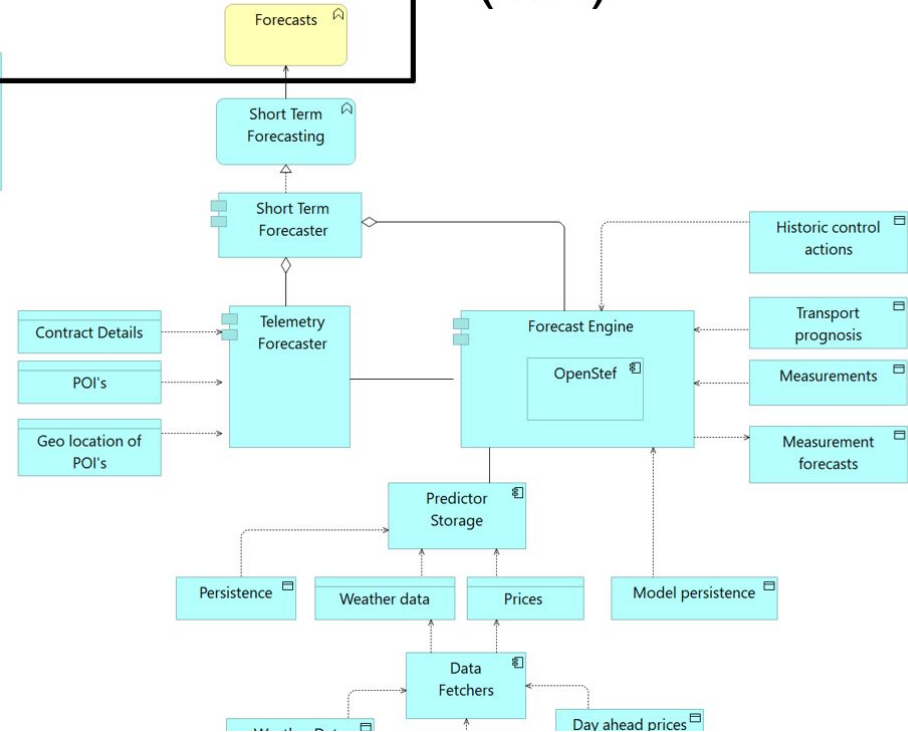
- The LF Energy Architecture Capability
- The architecture domains we focus on :
 - *Project Architectures*
 - *Meta-models & Reference Architectures*
 - *LF Energy (Business) Functional Architecture*
- The following slides explain on the role of architecture in driving collaboration



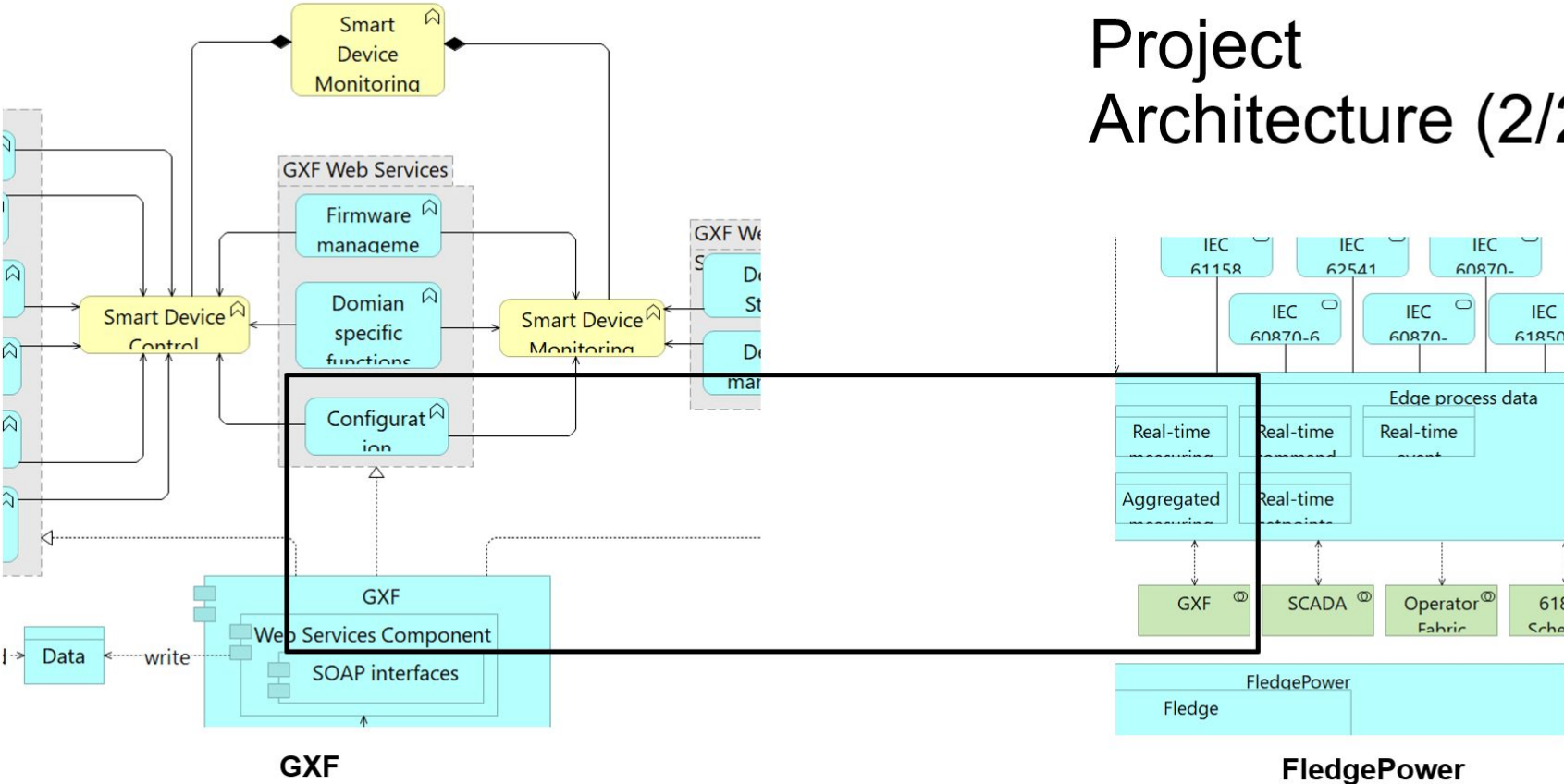
Project Architecture (1/2)



SOGNO

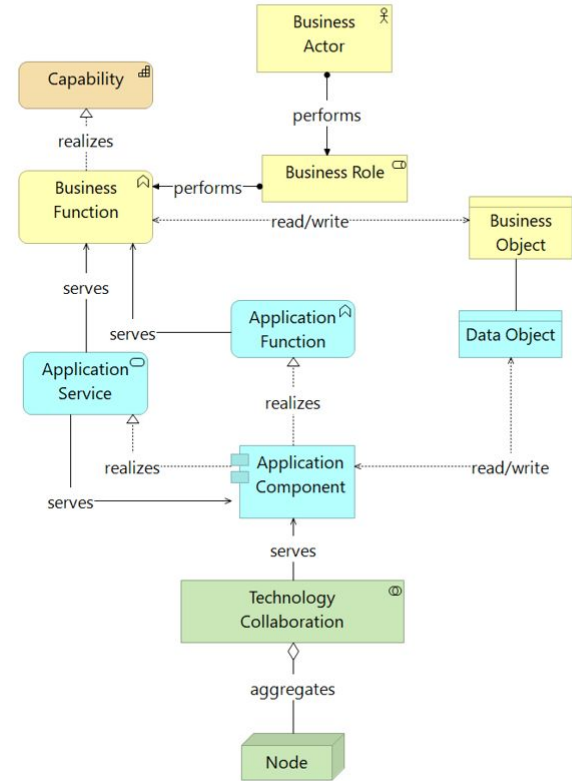


Project Architecture (2/2)



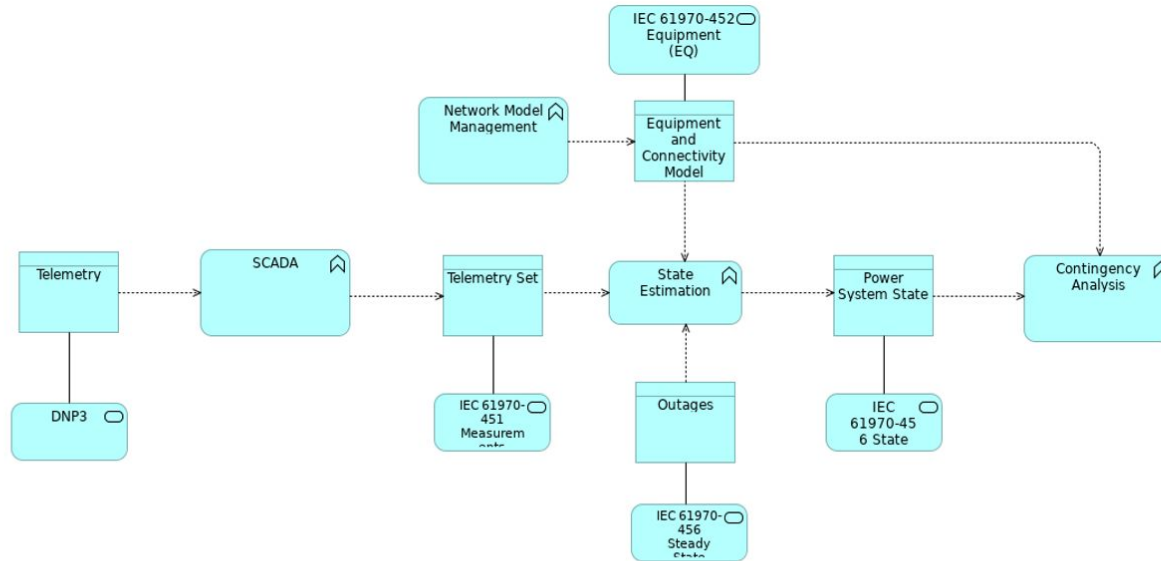
Meta-model for consistency

- Provides a common base line for project architectures
- Facilitates collaboration between projects
- Uses ArchiMate standards for greater reach
- Easy to apply for early-stage projects.

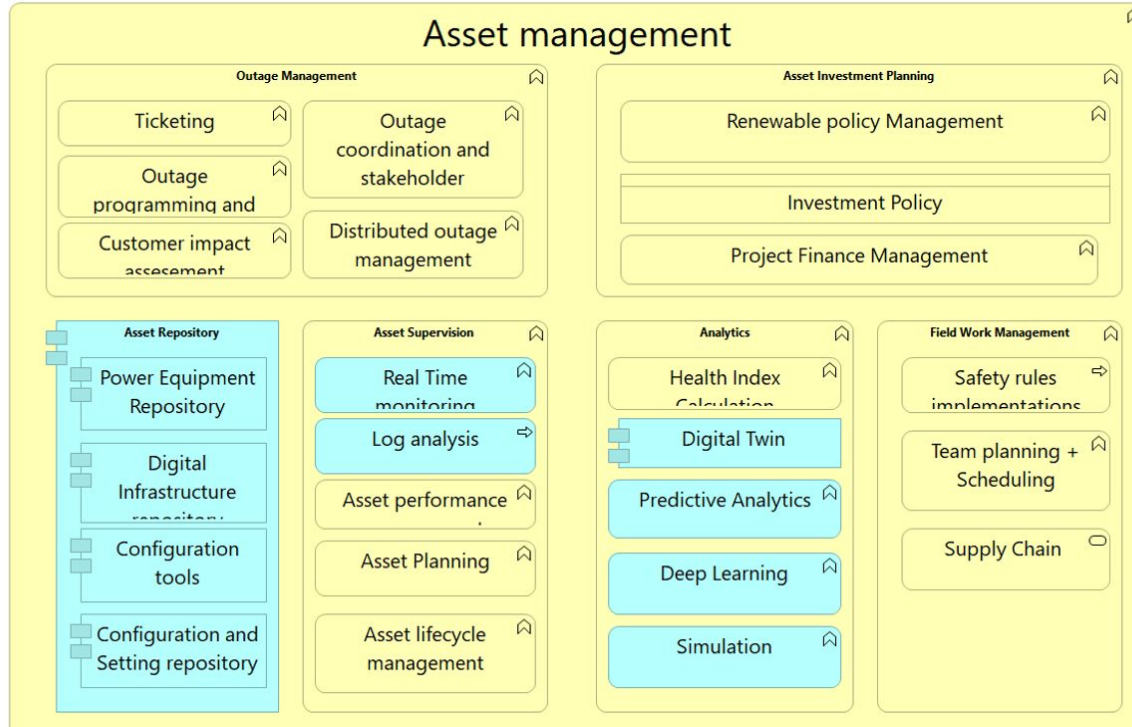


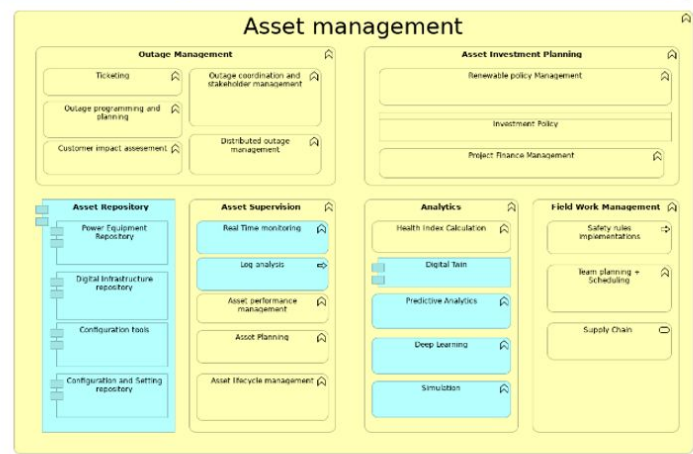
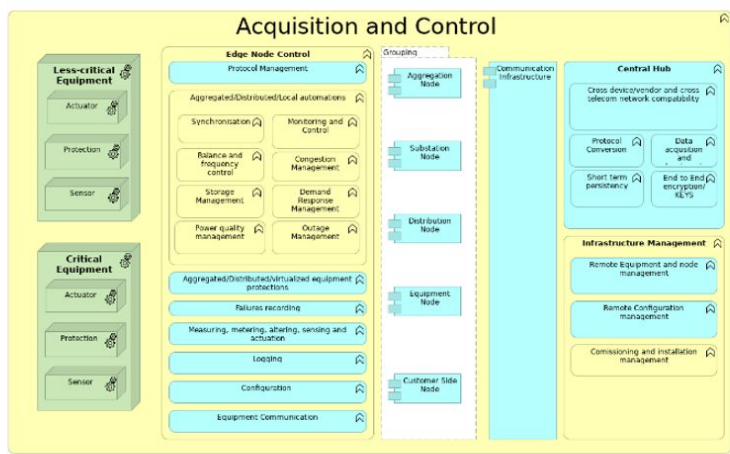
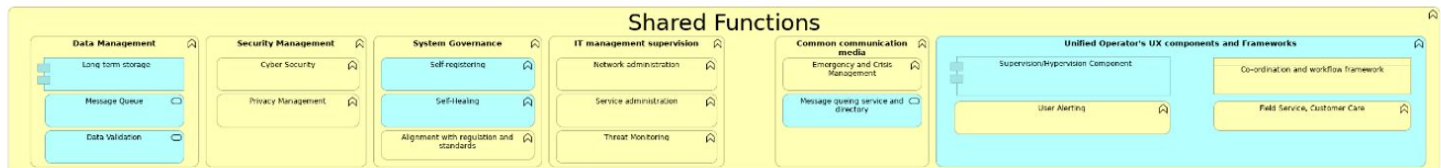
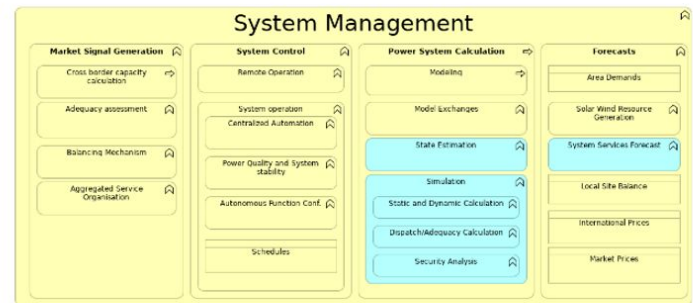
Reference Architecture

High level DFD w Data Exchange Standards (No Viewpoint) ⓘ



(Business) Functional Architecture





This view is not 100% architect compliant

Application – Challenges



- Interoperability – *p.a.*
- Modularity – *m.m, p.a, r.f*
- Upgradability – *p.a.*
- Speed of innovation – *f.a, p.a.*
- Cost-effectiveness (customization & scalability) – *r.f., f.a.*
- Speed of innovation – *r.a.*

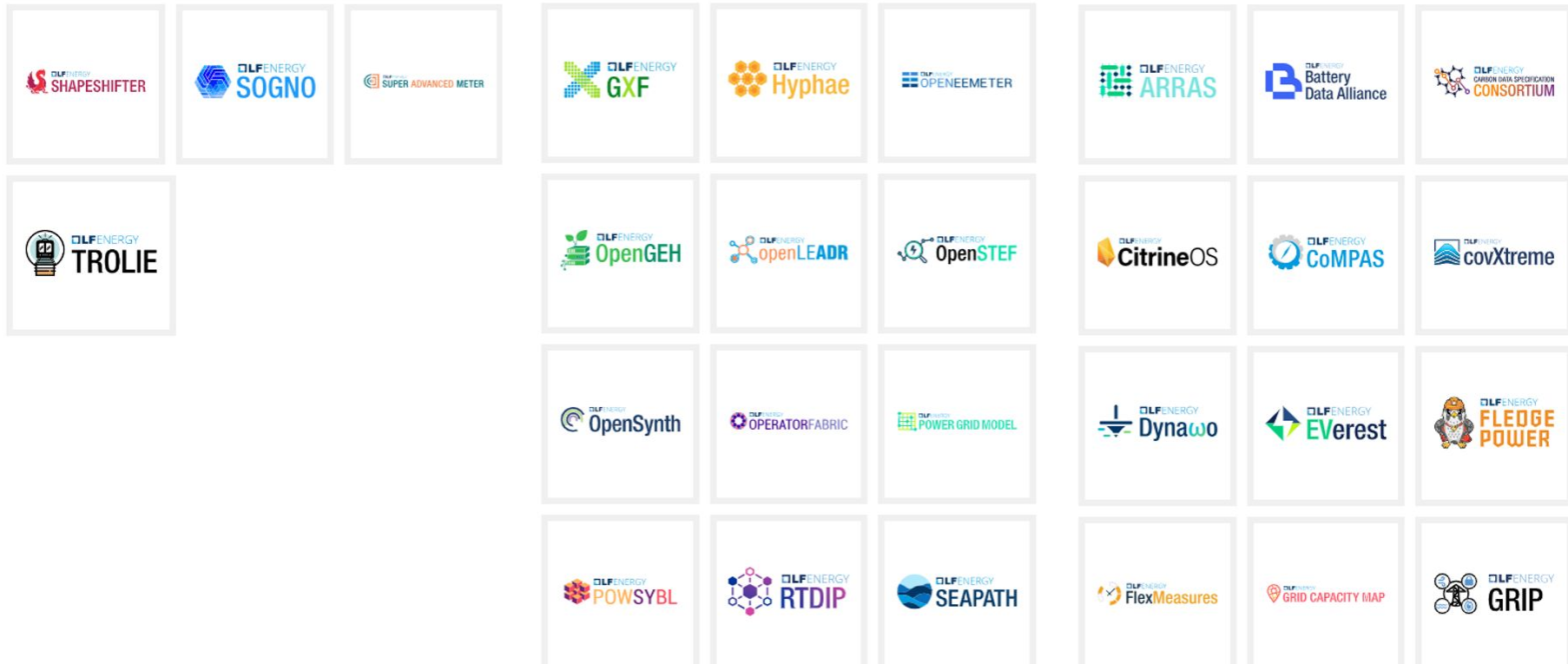
Our progress and plans

- New meta model – easier for a broader project set
- Project phases – early adoption, incubation and sandbox

- Nbility model ⇔ Project Architecture
- Nbility model ⇔ Functional Architecture
- Broader set of project architectures
- Collaborative use cases



Project growth 2018 – 2024... and growing



Connect, create, contribute

- Find us at

<https://github.com/lfenergyarchitecturemodel>

- Bi-weekly sessions
- Open discussion and collaborations
- Guests invites

- operations@lfenergy.org
- jonas.van.den.bogaard@alliander.com
- prince.singh@alliander.com



Marketing/PR/Events Updates

5:10 pm - 5:25 pm

OLFENERGY

Marketing and PR Updates

- Webinars
 - [FlexMeasures developer training](#) scheduled for 31 October
 - [Grid Capacity Map webinar](#) scheduled for 14 November
 - [TROLIE webinar](#) scheduled for 20 November
 - GridChat (Arras) webinar likely to occur in January
- Content
 - [BalticRCC/PowSyBl case study](#) published
 - JEA/FledgePOWER case study in process
 - emsys/PowSyBl case study in process
- Media Relations
 - Looking to ramp up earned media coverage, particularly with energy/utility trade outlets; some of your orgs/projects will hear from Dan to request participation in contributed articles
- [Event tracker](#) - please review and add any additional opportunities
- Use this [form](#) to submit any comms/marketing support requests
- See [media coverage spreadsheet](#) or [website](#) for recent articles

Events

- 2025 events plan
 - LF Energy Summit 2025 (Europe) - Finalizing venue options and dates
 - [Sponsorship prospectus](#) now available
 - [2024 post event report](#) also available
 - Partnering with Charin on an EV charging event near Detroit at the American Center for Mobility - 15 May 2025
 - European OCA Plugfest - hosted by PIONIX in May, one day dedicated to open source EV charging conference
 - Data-focused event around SF Climate Week (19-27 April 2025) - specific date/location TBA
 - LF Energy Summit 2025 (North America) - to take place on Friday, 3 October, immediately following the CIGRE event in Montreal - finalizing venue details
- [Event tracker](#) - please review and add any additional opportunities

Upcoming Event CFPs

North America

- [ARPA-E Energy Innovation Summit](#) - March 17-19, 2025 - Washington, DC - Rolling submission deadline - email speakinginquiry@eventpowersupport.com to apply to speak
- [Energy Thought Summit - May 19-22, 2025 - San Antonio, TX - Rolling submission deadline](#)
- [IEEE PES General Meeting - July 27-31, 2025 - Austin, TX - Submission deadline November 11](#)
- [RE+ - September 8-11, 2025 - Las Vegas - Rolling Submission deadline](#)
- [CIGRE - Sept 29-Oct 2, 2025 - Montreal, Quebec - Submission deadline November 27](#)
- [International Energy Program Evaluation Conference - Oct 6-7, 2025 - Denver, CO - Submission deadline November 15](#)

Europe

- [FOSS Backstage - March 10-11, 2025 - Berlin - Submission deadline November 13](#)
- [KubeCon Europe - April 1-4, 2025 - London - Submission deadline November 24](#)
- [The smarter E Europe \(EmPower\) - May 7-9, 2025 - Munich, Germany - Submission deadline December 6](#)
- [MOVE - June 18-19, 2025 - London - Rolling submission deadline](#)
- [PacWorld - June 23-26, 2025 - Glasgow - Submission deadline December 15](#)

Closing and Next Meeting

5:25 pm - 5:30 pm

OLFENERGY

Next TAC Meeting

The next meeting of the LF Energy TAC is scheduled for 20 November 2024 at 8:00 am US Pacific Time/11:00 am US Eastern Time/5:00 pm Central European Time. Agenda will include:

- General Updates
- 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>

APPENDIX

Marketing and PR Updates

Recent Media Coverage

- [TFIR - Hydro-Québec joins LF Energy](#)
- [TFIR - Code quality and security are crucial for open source projects | Nico Rikken, Alliander](#)
- [TFIR - Open source foundations to accelerate the energy transition | Alex Thornton – LF Energy](#)
- [TFIR - LF Energy's SEAPATH project aims to drive the next generation of energy management](#)
- [TFIR - What are the unique challenges in the energy sector?](#)
- [EnergyCentral - How French Transmission System Operator, RTE, Leverages Open Source to Build Next-Gen Substation Monitoring and Controls](#)
- [TFIR - LF Energy's role to accelerate decarbonization in the energy sector](#)
- [EC&M - Open-Source Platform EVerest to Advance Electric Vehicle Charging Interoperability](#)
- [Electronic Design - This Week in PowerBites: Open-Source EV Charging, Solid-State Circuit Protection](#)
- [TFIR - Open source drives technical transformation of vertical industries: Linux Foundation Report](#)
- [Solar Builder - Solving public EV charging issues with open-source software](#)
- [TFIR - LF Energy's role in global decarbonization and grid standardization](#)
- [Electronic Design - Open-Source EV Charging: Linux-Based Platform Simplifies Interoperability](#)
- [TFIR - United States is ready to tackle Climate Crisis with the help of Open Source | Boris Dolley](#)



OLFENERGY