



# TAC Meeting

7 February 2023

# Antitrust Policy Notice

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# Remembering Shuli



Anyone wishing to leave a memorial can do so at

<https://github.com/lf-energy/memorials/blob/main/shuli-goodman.md>

Those wishing to make a donation in her memory can do so at

<https://crowdfunding.lfx.linuxfoundation.org/initiative/aaa421b9-c10b-4e68-9233-26608cf54187>

# Agenda

## Opening (15 Minutes) 5:00 - 5:15 pm

- **Landscape updates**
- **TAC Sponsors for projects**
- **Summary of last TAC and Board meeting**

## TAC Business (75 Minutes) 5:15-6:25 pm

- Power Grid Model Presentation 5:15- 5:35 pm
- Hyphae Annual Review 5:35-6:00 pm
- Marketing for Projects 6:00- 6:10 pm

## Closing and Next Meeting (5 Minutes) 6:10- 6:15 pm

# Project Review Cycle

Project	Current Level	Initially Accepted	Last Review Date	Next Review Date
Hyphae	Incubation	December 8, 2020	December 14, 2021	February 7, 2023
<b>FledgePOWER</b>	<b>Incubation</b>	<b>February 11, 2021</b>	<b>February 15, 2022</b>	<b>February 28, 2023</b>
SOGNO	Early Adoption	October 27, 2020	March 8, 2022	March 21, 2023
OCP Cloud Connector	Sandbox	March 8, 2022		March 21, 2023
Shapeshifter	Incubation	April 6, 2021	April 19, 2022	April 11, 2023
Grid Capacity Map	Incubation	April 27, 2021	July 12, 2022	June 18, 2023
OperatorFabric	Early Adoption	April 30, 2019	June 21, 2022	June 20, 2023
CoMPAS	Incubation	May 5, 2020	July 12, 2022	June 20, 2022
OpenEEMeter	Incubation	June 4, 2019	September 13, 2022	September 26, 2023
GXF	Early Adoption	February 4, 2020	October 4, 2022	October 17, 2023
OpenGEH	Sandbox	October 12, 2021	October 4, 2022	October 17, 2023
Arras	Sandbox	July 12, 2022		July 18, 2023
Archimate Working Group	Active	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
FlexMeasures	Incubation	November 2, 2021	November 15, 2022	November 28, 2023
PowSyBI	Early Adoption	April 30, 2019	November 15, 2022	November 28, 2023
EVERest	Incubation	October 12, 2021	December 6, 2022	December 19, 2023
OpenLEADR	Incubation	September 15, 2020	December 6, 2022	December 19, 2023
Dynawo	Sandbox	December 6, 2022		December 5, 2023
OpenFIDO	Sandbox	January 17, 2023		January 17, 2023
SEAPATH	Incubation	October 6, 2020	November 23, 2021	January 17, 2023
SAM (Super Advanced Meter)	Working Group		March 29, 2022	March 23, 2023
DAWG & FAWG	Working Group		January 25, 2022	N/A

# TAC Voting Members

New members in **bold**

<b>Full Name</b>	<b>Account Name</b>	<b>Appointed By</b>
Boris DOLLEY	RTE (Reseau de Transport dElectricite)	Vote of TSC Committee - OperatorFabric
Anne Tilloy	RTE (Reseau de Transport dElectricite)	Vote of TSC Committee - PowSyBI
Carmen Best	Recurve	Vote of TSC Committee - OpenEEmeter
Jonas van den Bogaard	Alliander	Membership Entitlement
Maarten Mulder	Alliander	Vote of TSC Committee - GXF
Benoît Jeanson	RTE (Reseau de Transport dElectricite)	Membership Entitlement
Antonello Monti	RWTH Aachen University	Vote of TSC Committee - SOGNO
Art Pope	Google	Membership Entitlement
Avi Allison	Microsoft	Membership Entitlement
Bryce Bartmann	Shell	Membership Entitlement

# LF Energy Hosted Project and Working Group Leads

Changes in **bold**

Project	Project Lead(s)
PowSyBI	Anne Tilloy, RTE
OperatorFabric	Boris Dolley, RTE
OpenEEmeter	Carmen Best, Recurve
GXF	Maarten Mulder, Alliander
SOGNO	Antonello Monti, RWTH Aachen University
CoMPAS	Frederic Fouseret, RTE & Sander Jansen, Alliander (TAC Representative)
FledgePOWER	Akli Rahmoun, RTE
Hyphae	Asimena Korompili, RWTH Aachen University
openLEADR	Lonneke Driessen & Stan Janssen, OpenADR
SEAPATH	Aurelien Watere, RTE
Grid Capacity Map	Per Lysemose Hansen, Energinet
Shapeshifter	Jelle Wijnja, Alliander
OpenSTEF	Frank Kreuwel, Alliander
EVERest	Marco Möller, PIONIX
OpenGEH	Per Lysemose Hansen, Energinet
FlexMeasures	Nicolas Höning, Seita Energy Flexibility B.V.
OCPP Cloud Connector	Rebecca Wolkoff, Chargenet
Arras	David Chassin, SLAC
Dynawo	Marco Chiamello, Benoît Jeanson, RTE
OpenFIDO	David Chassin, SLAC
Full Architecture WG (FAWG)	Benoît Jeanson, RTE
Real Time Data Ingestion Platform (RTDIP)	Bryce Bartmann, Shell
Carbon Data Specification Consortium (CDSC)	TBD

# Landscape now with more project info!

We are using the LF Energy Landscape to showcase more project information:

- Mailing List/Slack Channel
- LFX Insights
- SBOM
- Wiki
- TSC Meeting Notes
- Calendar
- Contribution Guidelines

**ACTION: Project leads please review your entry and ensure it is accurate; issue PR for any changes needed.**



LF Energy Early Adoption    LF Project

Open Source Software    License Mozilla Public License

CII Best Practices 25%

Crunchbase	crunchbase.com/organization/lf-energy		
LinkedIn	linkedin.com/company/lf-energy		
Twitter	@LFE_Foundation	Latest Tweet	this week
First Commit	5 years ago	Latest Commit	3 weeks ago
Contributors	35	Headcount	1-10
Headquarters	San Francisco, California		
Mailing List	<a href="https://lists.lfenergy.org/g/sogno-discussion">https://lists.lfenergy.org/g/sogno-discussion</a>		
Slack Channel	#sogno		
LFX Insights	<a href="https://insights.lfx.linuxfoundation.org/projects/lfenergy%2Fsogno">https://insights.lfx.linuxfoundation.org/projects/lfenergy%2Fsogno</a>		
Wiki Page	<a href="https://wiki.lfenergy.org/display/HOME/SOGNO">https://wiki.lfenergy.org/display/HOME/SOGNO</a>		
SBOM	<a href="https://github.com/lfscanning/spdx-lfenergy/tree/main/sogno">https://github.com/lfscanning/spdx-lfenergy/tree/main/sogno</a>		
TSC Meeting Notes	<a href="https://github.com/sogno-platform/tsc/tree/master/tsc/meetings">https://github.com/sogno-platform/tsc/tree/master/tsc/meetings</a>		
Calendar	<a href="https://lists.lfenergy.org/g/sogno-tsc/calendar">https://lists.lfenergy.org/g/sogno-tsc/calendar</a>		
Contribution Guidelines	<a href="https://github.com/sogno-platform/tsc/blob/master/CONTRIBUTING.md">https://github.com/sogno-platform/tsc/blob/master/CONTRIBUTING.md</a>		



# 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.”*

**ASK: Volunteer to be a TAC sponsor for a project**

Project	Current Level	TAC Sponsor
Archimate Working Group	Working Group	
Arras	Sandbox	Antonello Monti
CoMPAS	Incubation	
Carbon Data Specification Consortium	Standards	
Dynawo	Incubation	Art Pope
EVERest	Incubation	
FledgePOWER	Incubation	Benoît Jeanson
FlexMeasures	Incubation	
Grid Capacity Map	Incubation	
GXF	Early Adoption	Jonas van den Bogaard
Hyphae	Incubation	Antonello Monti
OCPP Cloud Connector	Sandbox	Bryce Bartmann
OpenEEmeter	Incubation	Carmen Best
OpenFIDO	Sandbox	
OpenGEH	Sandbox	
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OpenSTEF	Incubation	Jonas van den Bogaard
OperatorFabric	Early Adoption	Boris Dolley
PowSyBI	Early Adoption	Anne Tilloy
Real Time Data Ingestion Platform (RTDIP)	Sandbox	
SEAPATH	Incubation	Benoît Jeanson
Shapeshifter	Incubation	Jonas van den Bogaard
SOGNO	Early Adoption	Antonello Monti

# Updating overview deck

We are working to update the LF Energy overview deck to include a slide for each project.

**ASK: Please provide to [servicedesk.lfenergy.org](https://servicedesk.lfenergy.org)**

- **Technical Summary ( max 100 words )**
- **Top Use Cases ( max 3 )**
- **Latest release info ( including link )**
- **Link to architectural overview diagram**

# Summary of Last TAC Meeting

- Meeting notes and deck at <https://wiki.lfenergy.org/display/HOME/Technical+Advisory+Council#TechnicalAdvisoryCouncil-MeetingMinutes>

## Updates from the Board

# Agenda

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# Power Grid Model Presentation





# Power Grid Model

A High-Performance Distribution Grid Calculation Library

Tony Xiang, PhD | [tony.xiang@alliander.com](mailto:tony.xiang@alliander.com)



alliander

# Summary

- Power Grid Model: an open-source project for distribution power system calculation.
  - <https://github.com/alliander-opensource/power-grid-model>
- In this presentation
  - Why a new project?
  - What is Power Grid Model?
  - How does it perform?
  - Deployment inside Alliander
  - Road to open-source

# Who are we? Who am I?



Yu (Tony) Xiang, PhD

Lead Scientific Engineer  
Chapter Advanced Analytics  
@Alliander

Guest Lecturer  
@Eindhoven University of Technology



Peter Salemmink, MSc

Data Scientist  
Chapter Advanced Analytics  
@Alliander

26-1-2023



Electricity grid length

**92,000** km

91,000 km in 2019

Gas grid length

**42,000** km

42,000 km in 2019

Number of customer connections

**5.8** million

5.8 million in 2019



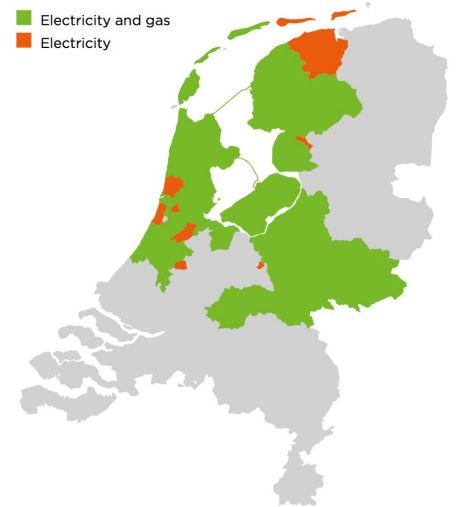
Number of employees

**5,881** FTEs

5,703 FTEs in 2019



■ Electricity and gas  
■ Electricity

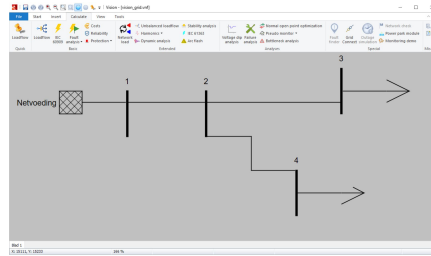




# Traditional workflow for power system analysis



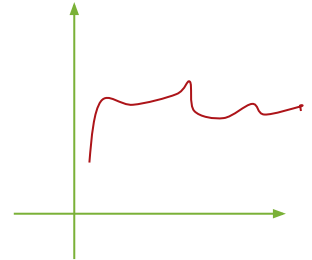
Data files



Commercial software\*

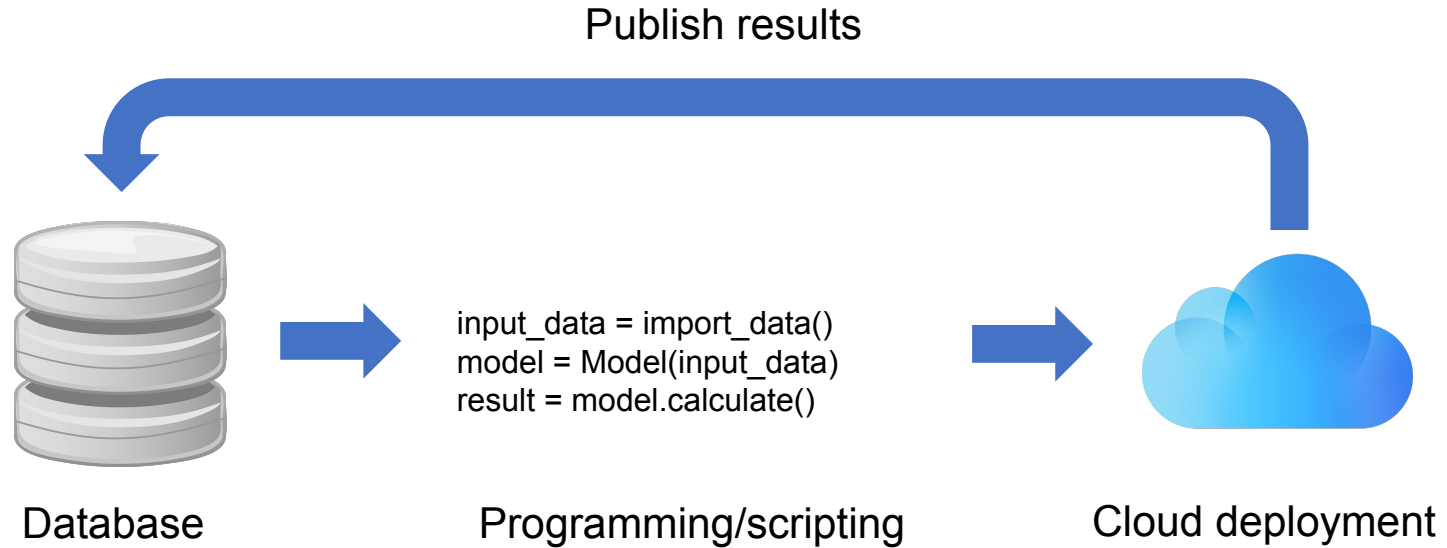


Built-in function\*

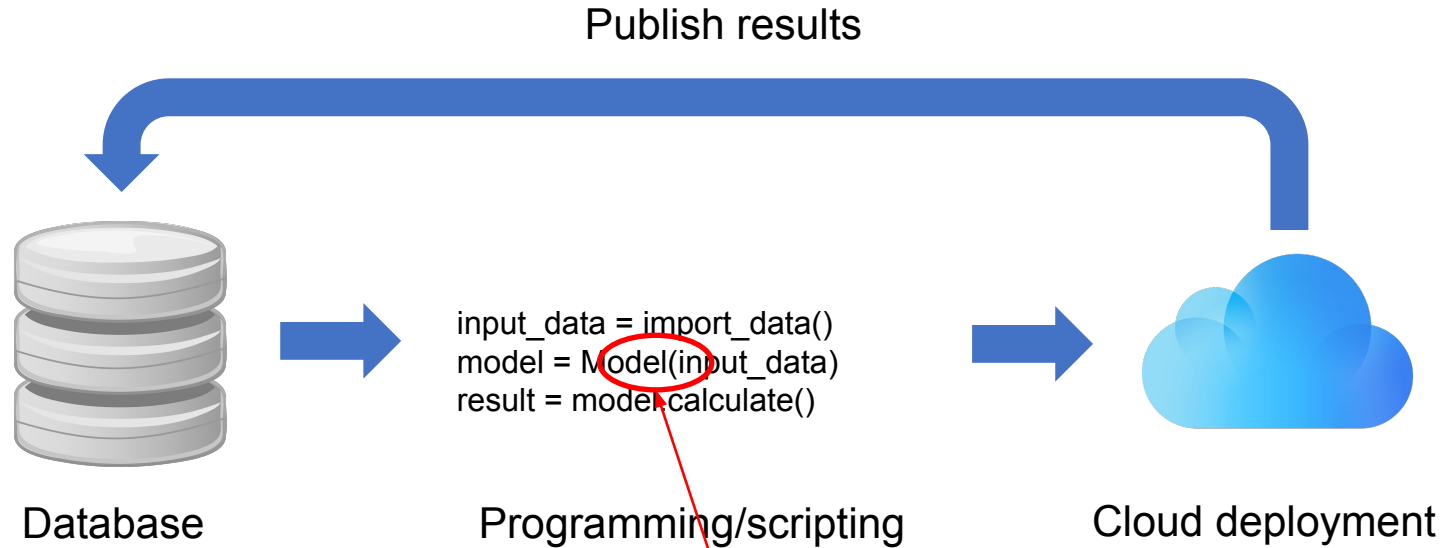


Results

# Modern workflow for power system analysis



# Modern workflow for power system analysis



# Why a new library?

	Commercial software	Existing open-source solution
Power system calculation functionalities	Good	Good
Asymmetric calculation support	Good	Mediocre
Easy to use and well documented software API	Mediocre	Good
Performant on large dataset and/or batch calculation	Depends?	Mediocre
Efficient parallelization	Depends?	Mediocre
Cross-platform and scalable in cloud	Mediocre	Good

# Alliander in-house library: Power Grid Model

- Power System Calculation Functionalities
- Symmetric and asymmetric calculation
- Power flow
  - Newton-Raphson
  - Iterative current (equivalent to backwards/forwards for radial network)
  - Linear current (approximation)
  - Linear impedance (approximation)
- State estimation
  - Iterative linear method

# Alliander in-house library: Power Grid Model

- Efficient implementation in C++
  - Native shared-memory multi-threading for parallelization in batch calculations
- API in Python
  - Stable and easy-to-use
  - Well-documented
- Cross-platform
  - Publish binary Python packages in official PyPI
  - <https://pypi.org/project/power-grid-model/>
  - Built for Windows (x64), Linux (x64/arm64), macOS (x64/arm64)

# Model Validation

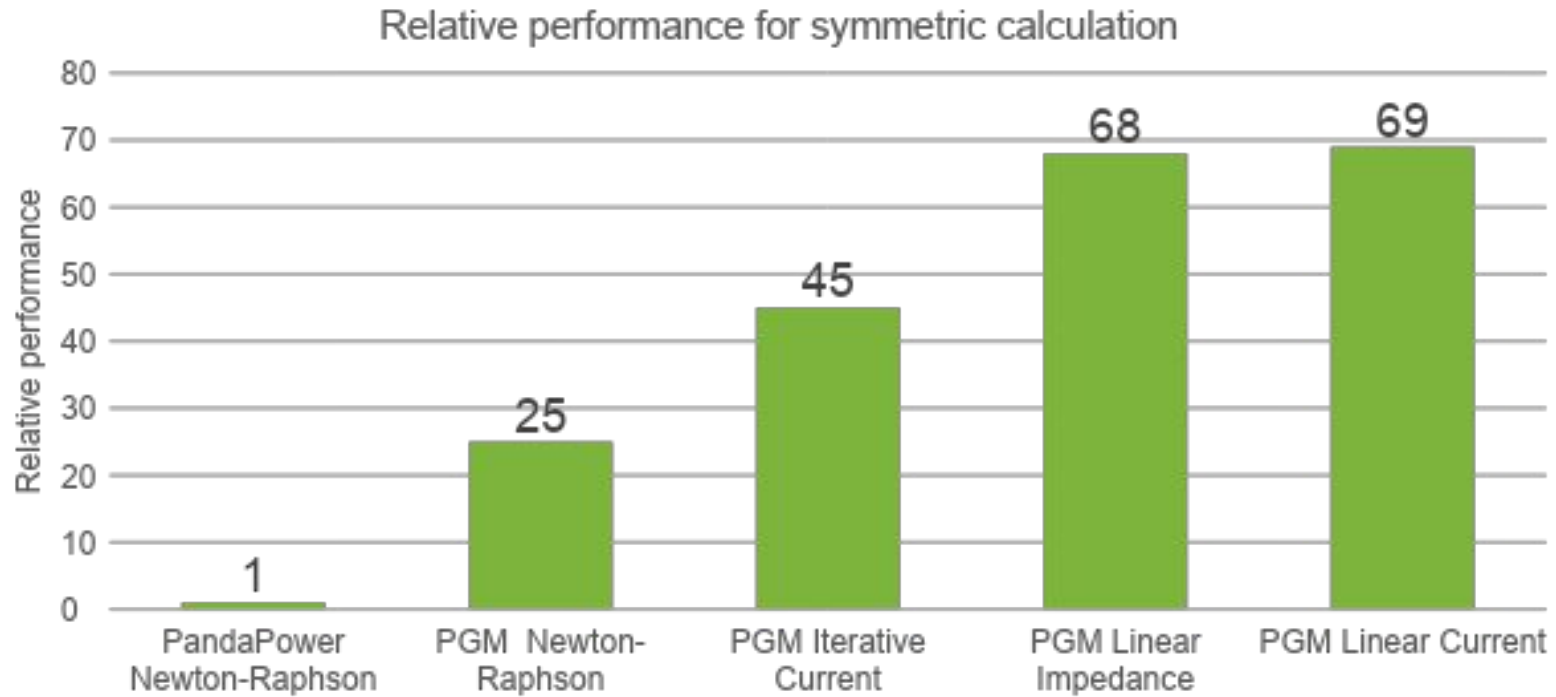
- Validation of the library against reference models with 80+ test cases
  - Hand calculation
  - Vision
  - Gaia
  - PowerFactory
  - PandaPower
- Continuous validation as part of CI pipeline in GitHub Actions

# Performance Benchmark

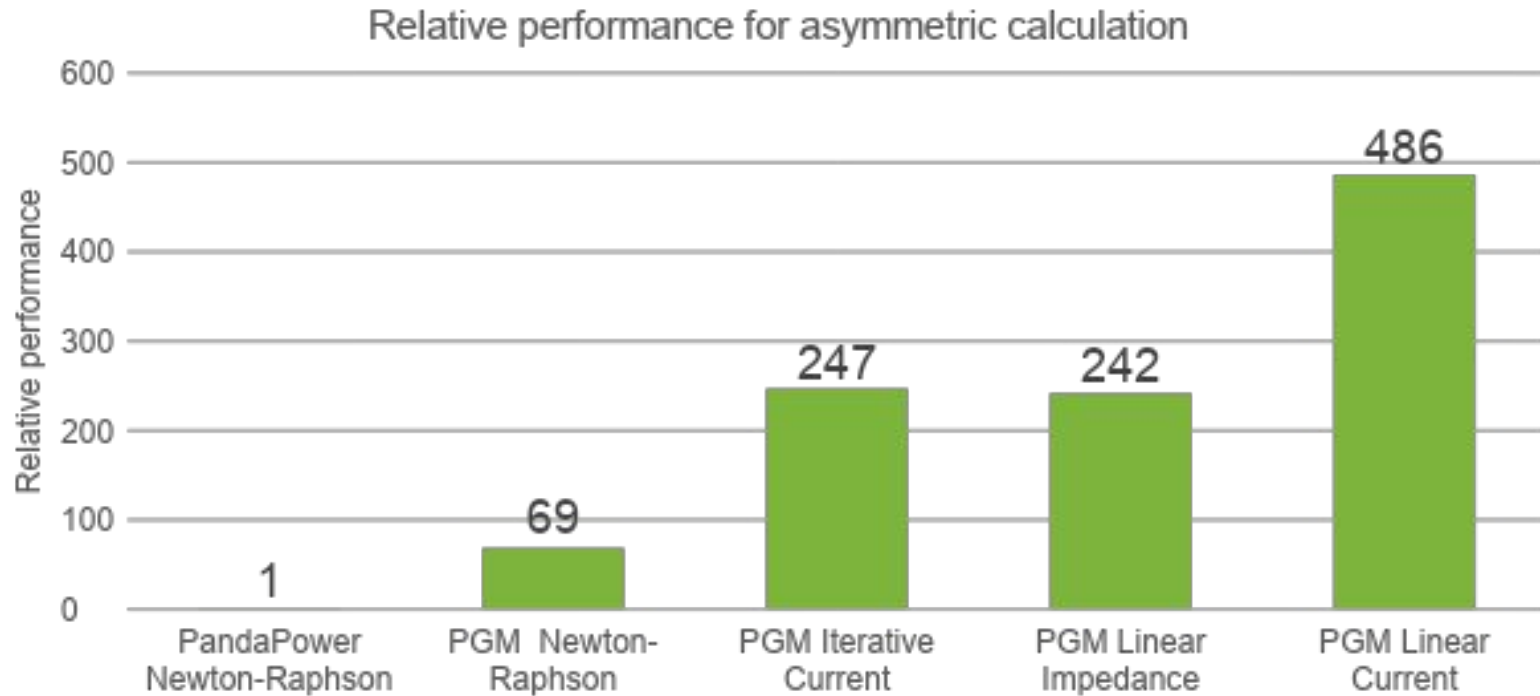
- Compare performance of Power Grid Model and PandaPower
  - <https://github.com/alliander-opensource/power-grid-model-benchmark>
  - 1000 nodes radial network
  - Time-series symmetric and asymmetric power flow calculation in 1000 steps
  - Testing environment: Intel i7-8850H, 40 GB RAM, single-thread in Linux (WSL)
  - Library version: power-grid-model 1.4.0, pandapower 2.10.1



# Performance Benchmark



# Performance Benchmark



# Current Deployment

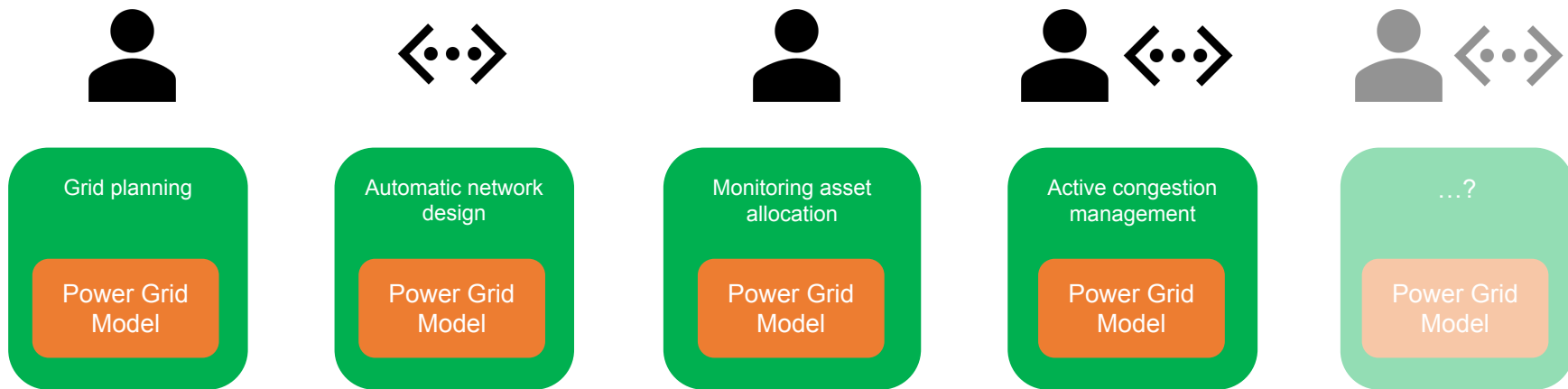
- Data conversions
  - CIM
  - Vision
  - GridCal
  - Gaia (pending)
  - PandaPower (pending)

# Current Deployment

A fundamental building block for Alliander

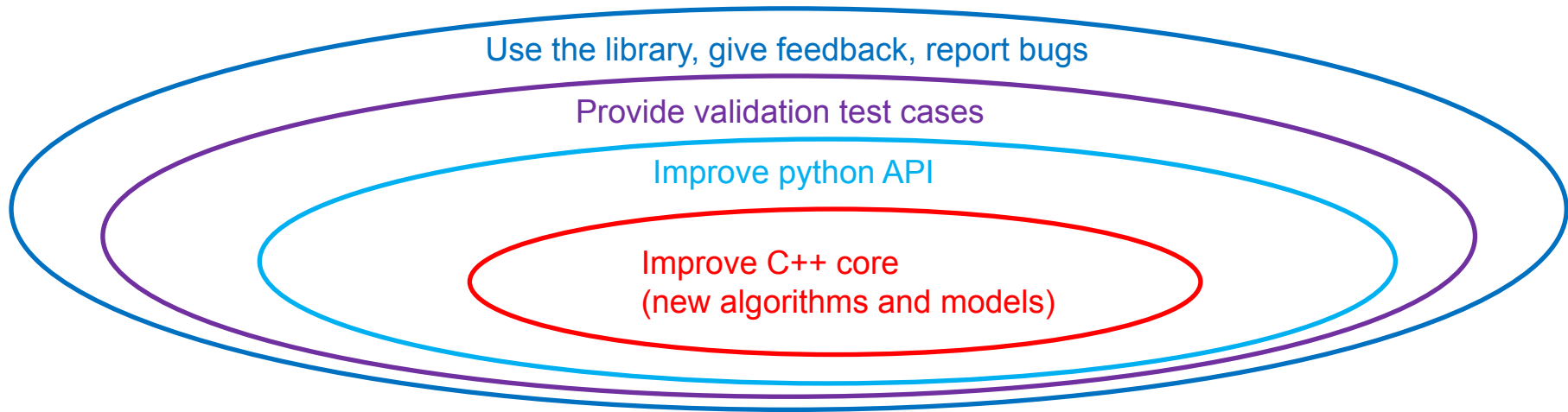
alliander

- Deployed in 10+ applications inside Alliander



# Road to Open Source

- Power Grid Model is an open-source project
  - <https://github.com/alliander-opensource/power-grid-model>
- Ways of collaboration and contribution



# Road to Open Source

- Current active partners



# How to get started?

alliander

## Power Grid Model TSC & maintainers



Tony Xiang  
(Chair)



Werner van Westering



Peter Saleminck



Bram Stoeller



Nitish Bharambe



Jonas van den Bogaard



Check out Alliander Open Source website  
<https://www.alliander.com/en/open-source/>



Visit Power Grid Model Github community  
<https://github.com/alliander-opensource/power-grid-model>



Mail the team: [dynamic.grid.calculation@alliander.com](mailto:dynamic.grid.calculation@alliander.com)



Tutorial workshop  
<https://github.com/alliander-opensource/power-grid-model-workshop>

# OLF ENERGY

## Annual Review for HYPHAE



# Hyphae

## **Brief Description:**

*Hyphae aims at building open-source control for AC/DC microgrids, which is modular and scalable, allowing the plug-and-play capability of power electronics-interfaced distributed energy resources, as well as the flexible expansion and resilience of microgrids.*

## **TSC Chairperson:**

*Antonello Monti (amonti@eonerc.rwth-aachen.de)*

## **TSC Members and Affiliations:**

*Asimonia Korompili (ACS, RWTH-Aachen University)*

## **Contributed by:**

*ACS, RWTH Aachen University*

## **Key Links:**

**Github:** <https://github.com/hyphae>

## **Website:**

<https://www.lfenergy.org/projects/hyphae/>

**Artwork:** N/A

## **Mailing lists:**

- <https://lists.lfenergy.org/g/hyphae-general>

**OpenSSF Best Practice Badge URL:** N/A

# Organizations contributing and/or using in production



# Key Achievements in the past year (1/2)

- Controller for converters in DC microgrid
  - Plug-and-play capability
  - Easy to customise and integrate to other systems
- Hardware set-up for DC microgrid control
  - Use for testing of control in real control device
  - Plan to be used also with real power-electronics devices

# Key Achievements in the past year (2/2)

- Promotion of LFE Hyphae project to FEN consortium
- FEN funding for support of Hyphae activities
  - Code generation of converter controller
  - OPF Python code as microservice in SOGNO platform
    - Connection with LFE SOGNO project
  - Converter modules for hardware setup of microgrid

# Growth Plan

- Connection with other projects on DC distribution grids
  - Hyperride project
  - Junior research group on design and verification of control & protection in DC systems
- Promotion of Hyphae project in FEN planning of third-phase projects starting in March 2023
  - ➡ ○ Promotion of Hyphae topics
  - ➡ ○ Stronger collaboration with FEN industry partners for contribution to Hyphae project

# Areas the project could use help on

- Enhance collaboration with SOGNO
  - Information input to Hyphae about needed system operation functions for microgrids and distribution systems (from viewpoint of system operators)
    - to be produced in Hyphae as open-source control/energy management solutions

# Feedback on working with LF Energy

- Motivation to turn into open source code (change of mindset)
- Becoming more familiar with practical considerations of industry and system operators
- Obtaining knowledge about relevant work in similar LFE projects and becoming motivated from their achievements (benefit from open source)

# TAC Open Discussion

OLFENERGY



# Marketing for Projects



# Marketing and PR Updates

[dbrown@linuxfoundation.org](mailto:dbrown@linuxfoundation.org)

+1 415-420-7880

- Digital transformation readiness research survey is closed; analysis in process
- Energy Devroom at FOSDEM was a huge success - large queues outside the room at all times. Photos and recap blog to come next week.
- Currently hosting LF Energy table at State of Open Con - Feb 7-8 in London
- Opportunity to attend Tech for Climate Action in Washington, DC on March 16 at no cost:  
<http://www.techforclimateaction.com/us>
- Owned 2023 Events
  - SustainabilityCon at Open Source Summit (CFP now closed)
    - May 10-12 - Vancouver; Sept 19-21 - Bilbao
  - LF Energy Summit ([CFP closes Feb 17](#))
    - June 1-2 - Paris, hosted by RTE
    - Sponsorships available; reach out to Dan to book
  - Embedded Open Source Summit ([CFP closes Feb 10](#))
    - June 27-30 - Prague (One-day LF Energy track focused on our embedded projects on June 30)
- Outreach committee kickoff meeting took place Jan 26 - [Minutes](#)
- New form now available for all comms/marketing requests (blogs, videos, case studies, etc.):  
<https://github.com/lf-energy/foundation/issues/new/choose>

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# Next TAC Meeting

The next meeting of the LF Energy TAC is scheduled for 28 February 2023 at 8:00 am US Pacific Time/11:00 am US Eastern Time/5:00 pm Central European Time.

**NOTE:** *New meeting invite for series titled 'LF Energy TAC meeting ( 2023 )' from 'LF Energy (LFE) - Meetings <[meetings@lfx.linuxfoundation.org](mailto:meetings@lfx.linuxfoundation.org)>'. Register for meeting at: <https://zoom-lfx.platform.linuxfoundation.org/meeting/98588947265>*  
Please remove all other meeting invites.

## **Agenda will include:**

- Recap of last Board Meeting and TAC
- FledgePOWER Annual Review



Thank you!