



# TAC Meeting

12 October 2021

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# 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
<b>Carmen Best</b>	<b>Recurve</b>	<b>Vote of TSC Committee - OpenEEmeter</b>
Arjan Stam	Alliander	Membership Entitlement
Jonas van den Bogaard	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

# LF Energy Hosted Project Leads

Changes in **bold**

Project	Project Lead(s)
PowSyBI	Anne Tilloy, RTE
OperatorFabric	Boris Dolley, RTE
<b>OpenEEmeter</b>	<b>Carmen Best, Recurve</b>
GXF	Jonas van den Bogaard, Alliander
SOGNO	Antonello Monti, RWTH Aachen University
EM2	<i>none</i>
CoMPAS	Frederic Fouseret, RTE
FledgePOWER	Akli Rahmoun, RTE
Hyphae	Kotaro Jinushi, Sony ESL
openLEADR	Lonneke Driessen & Stan Janssen, OpenADR
SEAPATH	Eloi Bail, Savoir-faire Linux
Grid Capacity Map	<i>none</i>
Shapeshifter	Jelle Wijnja, Alliander

# Agenda

## Opening (5 Minutes)

- **Summary of last TAC meeting & Updates from the Board Meeting**
- **Upcoming community meetings of interest**
- **Landscape updates**

## TAC Business (80 Minutes)

- Everest project proposal
- GXF annual review
- Green Energy DataHub project proposal
- OpenEEMeter/EM2 annual review

## Closing and next meeting (5 Minutes)

# 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

# Upcoming community meetings of interest

- If interested in participating in Security WG meetings, please joining the mailing list at <https://lists.lfenergy.org/g/security>
- CI/CD working group meeting - plan for next Tuesday, October 19th, 2021 at 8:00 am US Pacific Time/11:00 am US Eastern Time/ 5:00pm CET.
  - Details of work so far at <https://wiki.lfenergy.org/pages/viewpage.action?pageId=18311586>
  - Mailing list at <https://lists.lfenergy.org/g/cicd> with meeting invites.
- Please share others!

# 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	more... total: 52	
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>

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- **GXF annual review**
- **Green Energy DataHub project proposal**
- **OpenEEMeter/EM2 annual review**

## Closing and next meeting (5 Minutes)

# Everest project proposal





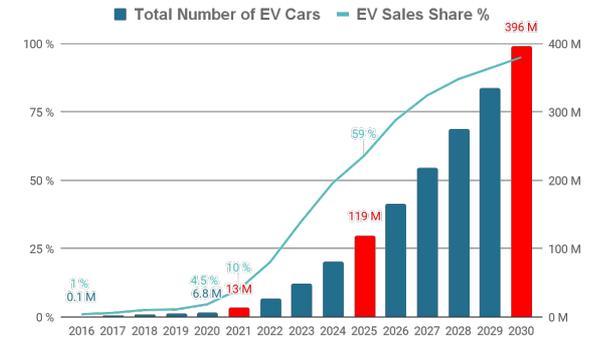
PIONIX

# EVERest

Managing Energy and Charging Cars  
with Open Source

PIONIX presents EVERest, a fully featured commercial open source software (COSS) stack for charging stations and a reference hardware implementation that works out-of-the box.

# ➤ Soon All Global Annually Sold 75 Mio. Cars Will Be Electric... ...and for Every Car ~1.2 Chargers Are Needed

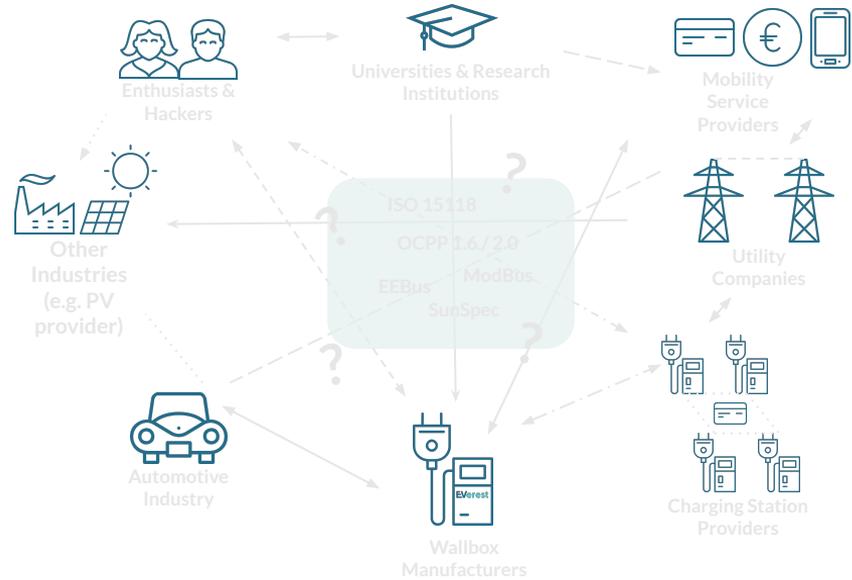




No De-facto standards and too many links:

- **High Fault-Rate**
- **Expensive & slow development**
- **Complex mechanisms to proliferate innovations**
- **Market fragmentation**

Customers and Industry suffering



# >We Empower The Ecosystem With a Community & Services

## Charging Station Providers



- Future proof through SW update path
- Reliable through broad testing by community
- Easy extensibility & customization through open source

## Wallbox Manufacturers



- Focus on USP features & reduce Time2Market
- Avoid integration problems and decrease costs
- Avoid vendor lock-in

## Automotive Industry



- Tests new models on unified ecosystem
- Easy & fast roll-out of new features
- Single point to demand/push infrastructure innovations

## Utility Companies



- SW for bidirectional dynamic charging
- Single entry point for edge control & innovation

## Mobility Service Providers



- Can build new services on top of widely adopted solution
- Fast rollout to existing network

## Universities & Research Institutions

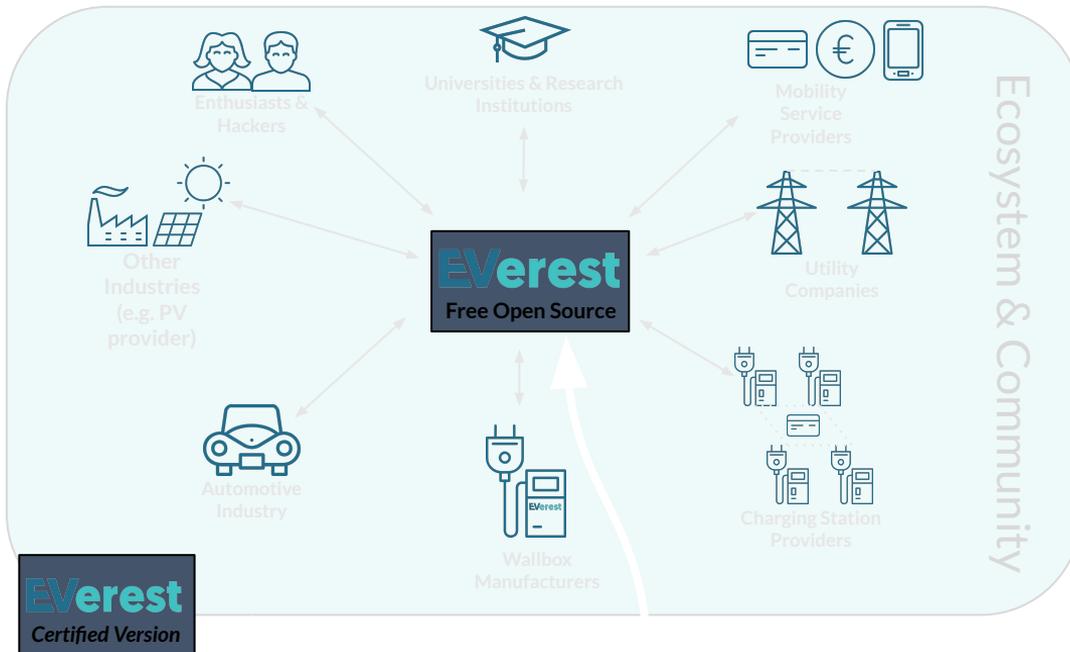


- Researched features can be easily adopted for mass market
- Technology base layer for research

## Other Industries



- HW Independent
- No vendor lock-in
- Access to technology base layer



## Pionix Updates & Integration Services

Payment for upgrades, updates, support and integration

## PIONIX

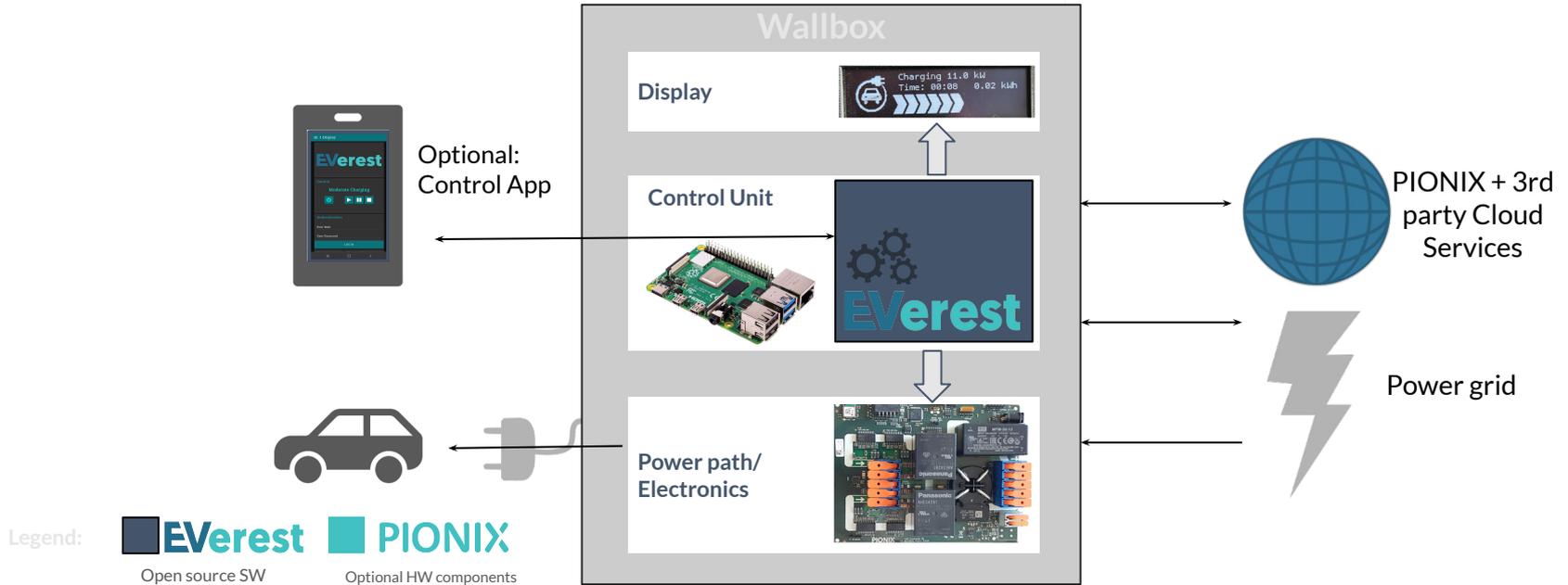
Initializing & Coordinating Community

## PIONIX Hardware

Payment per unit sold and setup fee

# How Everest Works

**EVERest** runs on charging stations and wallboxes and connects them to the world, building an ecosystem



# Competition - Filling the Gap

	<b>EVEREST</b>	 die modulare Wallbox  Typical open source	   Typical commercial	
Agile, Innovative, Extendable	++	++	--	0 no community: GPL + commercial dual Licence
Commercial Features	++	-- e.g. GPL Licence	++	++

Why us? - The only fully featured **open source e-mobility solution** that addresses the needs of **every player** in the e-mobility world.

# >The Founders



<https://www.linkedin.com/in/cornelius-claussen-b910b4164/>

## Cornelius Claussen (\*1982)

*Dipl. Physicist*

"I feel at home with the whole range of technology. I love exploring new technologies, thinking them through in detail and revolutionizing traditional solutions using unconventional deep-tech approaches"

Develops: Technical Architecture & Development

Founder: Pionier-Manufaktur, MAVinci, OpenTek



<https://www.linkedin.com/in/marco-m%C3%B6ller-049a1724/>

## Dr. Marco Möller (\*1982)

*Dr. Physics, BSc Informatic, Electronics*

"I am a networker through and through and I connect people, ideas, technologies and business. I love to understand things and connections from the ground up and I am never satisfied with off-the-peg knowledge. Living First Principle Thinking in a real way makes me happy."

Boosts: Technical Strategy & Networking

Founder: VetVise, Pionier-Manufaktur, MAVinci, MacroLAB



2016 sold  
drone startup to



<https://www.linkedin.com/in/johanna-claussen-00700925/>

## Johanna Claussen (\*1985)

*MSc. Physik*

"Success is made from the scratch - Loss as well! To combine creativity and innovation fascinates me, channeling those in strategic approaches the right way is what makes the difference."

Responsible: Product & Company Strategy

Founder: Pionier-Manufaktur, MAVinci



<https://www.linkedin.com/in/benjamin-mosler-38b8a7b9/>

## Benjamin Mosler (\*1989)

*Electrical engineer, Business economist, MBA*

"Evolve promising ideas into scalable business cases is my passion. I believe that challenging the status quo is the key to identify and realize creative solutions that could be a game changer."

Controls: Business Development & Operations

Founder: Pionier-Manufaktur, Mosler Consulting



<https://www.linkedin.com/in/prof-dr-falko-tappen-09542932/>

## Prof. Falko Tappen (\*1977)

*Prof. Hochschule Worms (Tax)*

"I support the team in all questions related to financing, taxes and law. In doing so, I draw on my extensive legal and tax law experience in major international law firms. In this way, optimal arrangements for any entrepreneurial initiative can be implemented from the very beginning."

Navigates: Legal & Finance

Founder: Pionier-Manufaktur, TCS Treuhand Steuerberatungsges.

# Meet Our Team

## Managing Directors of PIONIX



**Cornelius Claussen**  
Graduate in Physics



**Marco Möller**  
PhD in Physics  
BSc Computer Science



**Benjamin Mosler**  
Electrical engineer  
Business economist, MBA



**Johanna Claussen**  
MSc. Physics



**Falko Tappen**  
Prof. Tax law

### Backoffice



external



Kai-Uwe



Thilo



Leonardo



Tim



Anton



Andreas



Julian

Currently Hiring:  
• Devs  
• Sales  
• Biz Dev  
• Marketing

## Our Advisors:

### NEXT MOBILITY LABS

THE COMPANY BUILDER



**Felix Wagner**  
Managing Partner



**Armin Bieser**  
Managing Partner



**Romina Reuther**  
Venture Architect



**Dr. Peter Mertens**  
Former CTO Audi



**Thomas Andrae**  
Serial Founder



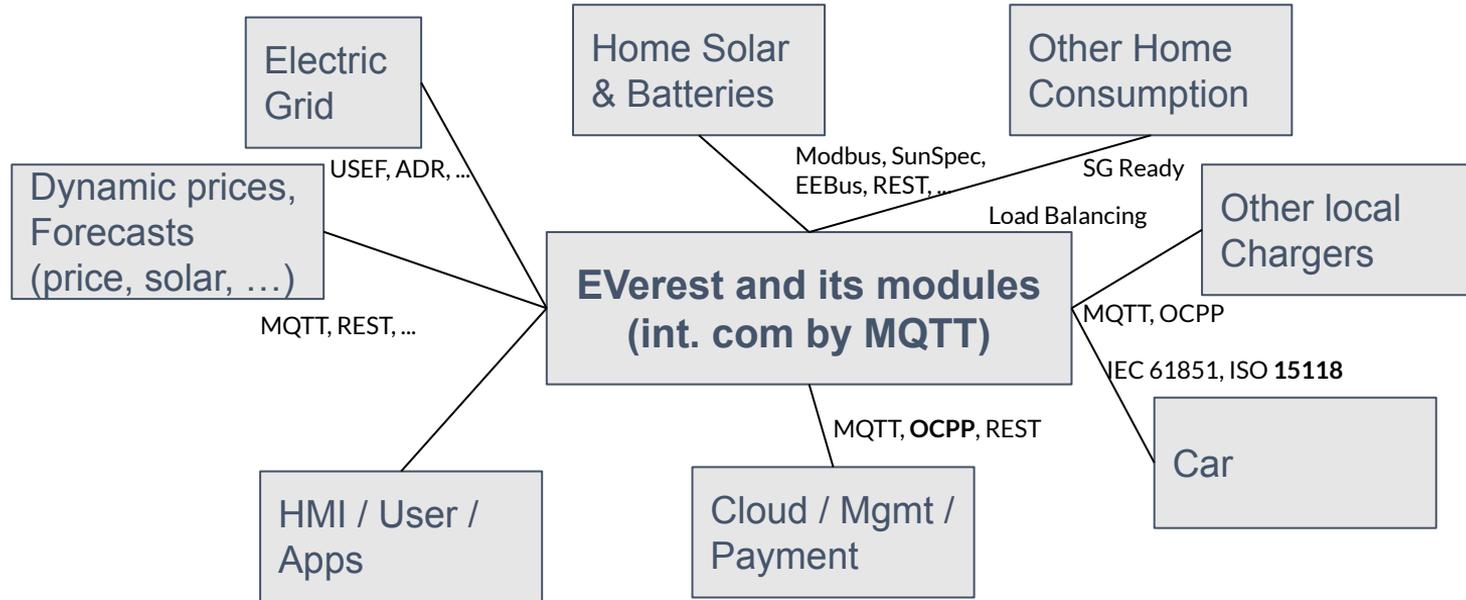
**Klaus Entenmann**  
Former CEO  
Daimler Financial  
Services AG

⇒ Focus on VC driven: fast growth and sustaining open source adoption phase

# Everest Tech

taken from: Nauta Capital, VC company <https://nautacapital.com/open-source-is-eating-europe/>

# ›Everest Connects Multiple Energy-Services



# EVEREST Classes

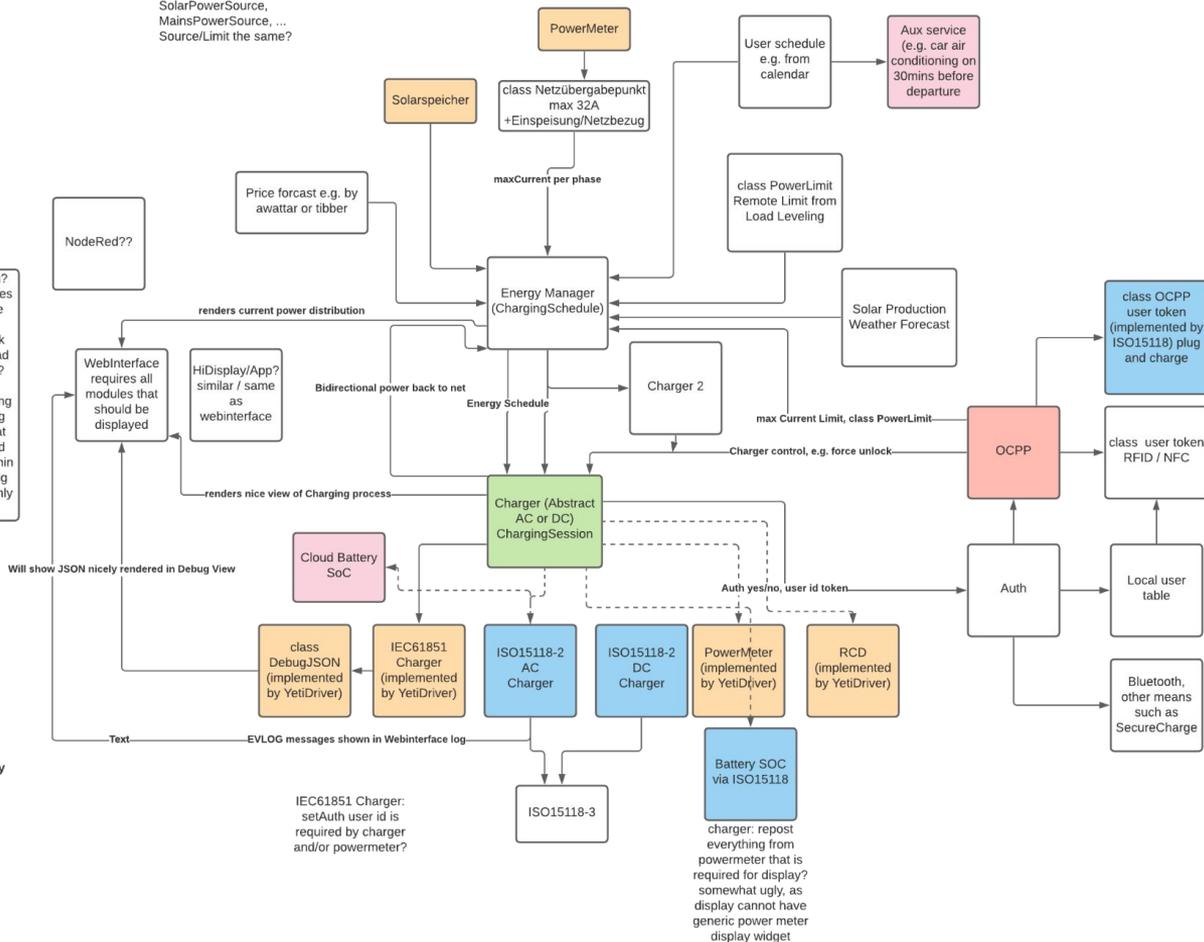
Framework:

- Requires 1..N of one class, e.g. N powersources, loop over required modules somehow. Maybe also requires all of certain class (e.g. debugview requires all debugJSON objects)
- config overlays: manufacturer default values in config.json, but user editable overrides in separate file editable by webinterface
- modules subfolder e.g.
- modules/ChargingDrivers/AC/Yeti
- requirement of base class / but specify implementation class in config.json
- enums?
- find out if optional requirement is met?

Or: separate classes for SolarPowerSource, MainsPowerSource, ... Source/Limit the same?

Config options:  
1) only in config.json: Manufacturer of Wallbox / port of Everest to HW  
2) settings for Electrician / Installation of Wallbox to the House  
3) user settings: End user will edit them from time to time as they wish

WebConfig? dependencies to that are loaded. Framework thing instead of module?  
Allows setting of all config options that are marked User or Admin or so. config json level only in file?



work in progress  
As of 2021-09-29  
Confidential / for Pionix internal use only

IEC61851 Charger: setAuth user id is required by charger and/or powermeter?

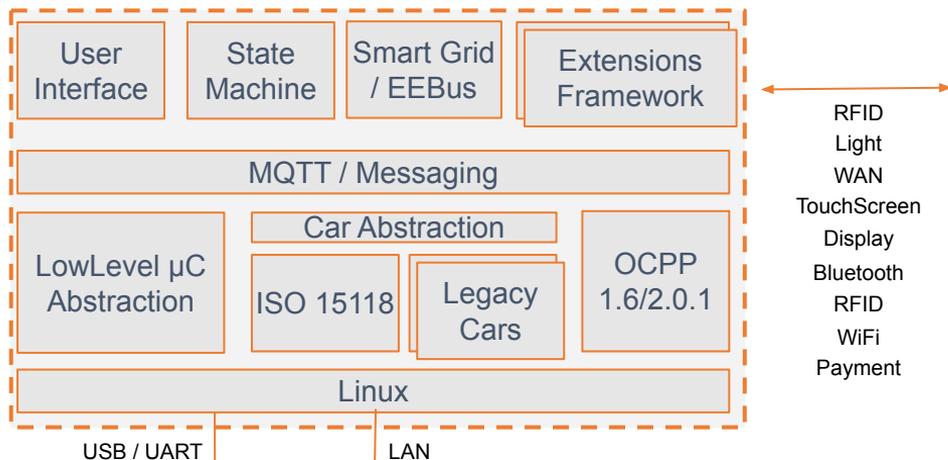
charger: repost everything from powermeter that is required for display? somewhat ugly, as display cannot have generic power meter display widget



# Overall Architecture

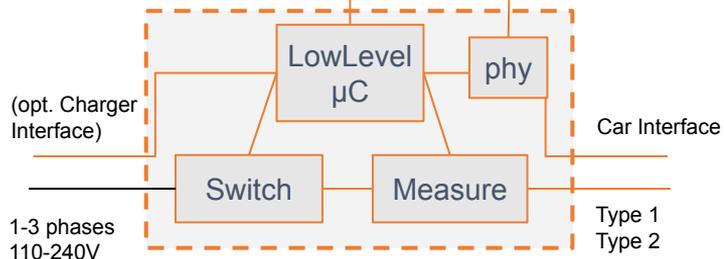
## High level Board:

- Complete Open Source Solution (MIT licence)
- Excessively **extensible** & modifiable
- SW also runs on standard HW (e.g. Raspberry Pi) alternatively to Pionix High level Board



## Low level Board:

- proprietary code
- commercial Pionix HW
- Certified



# >“/dev/box”: Commercial

## Dev-Kit

- Goal: Marketing for Starting a Developer Community
- Shipping EU+North America ~Q2 2022
- Via crowdfunding platforms  
Kickstarter / Indiegogo
- Supported by external crowdfunding marketing specialists
  
- Split into 4 PCBs
  - Energy Board (could act as standalone not so smart charger)
  - Compute Board (Raspberry Pi 4 + ...)
  - 1-2 x Display (compatible with metering law)
  - RFID Antenna

High level: e.g. Raspberry Pi

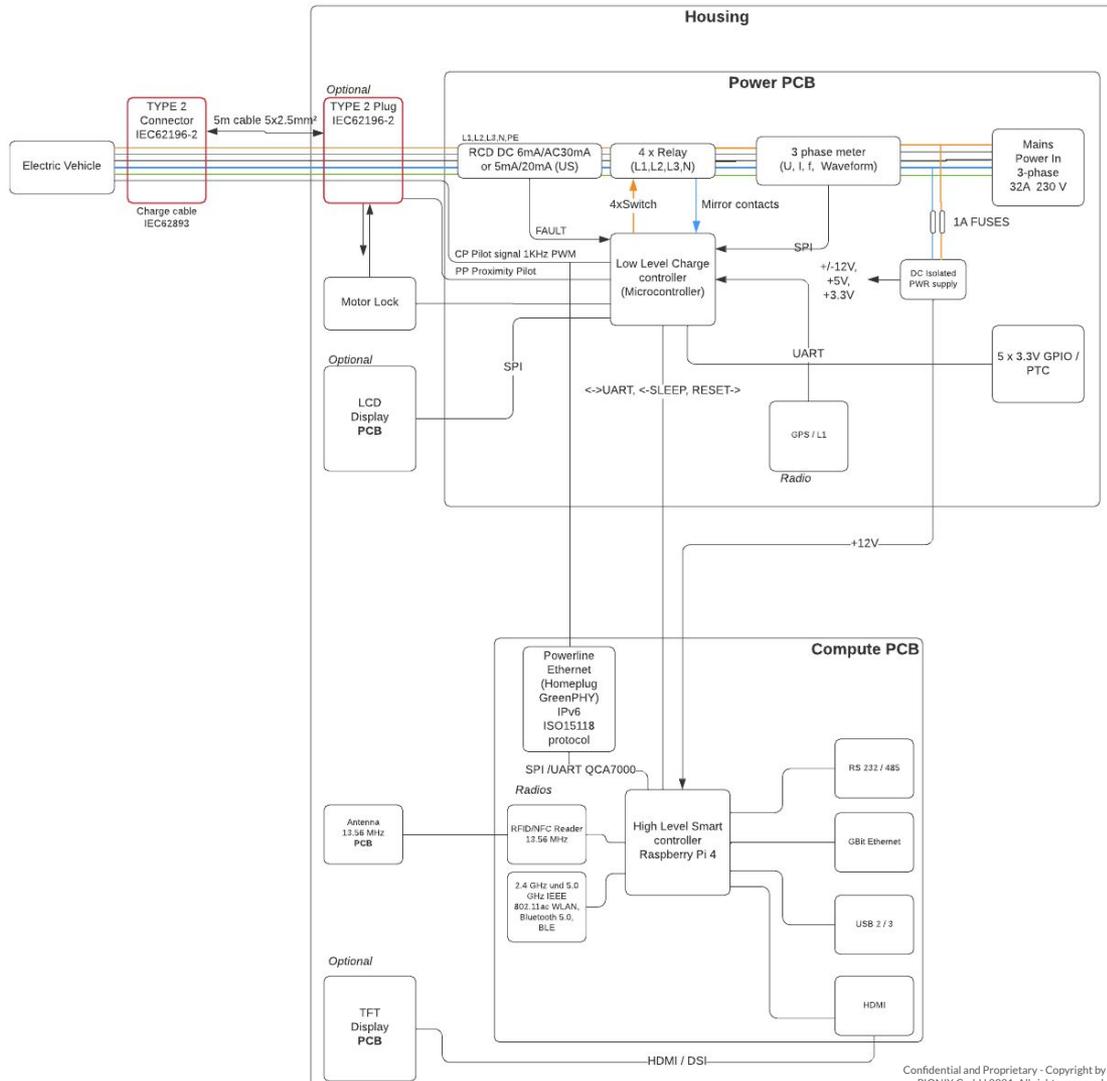


Low level: e.g. Custom Pionix

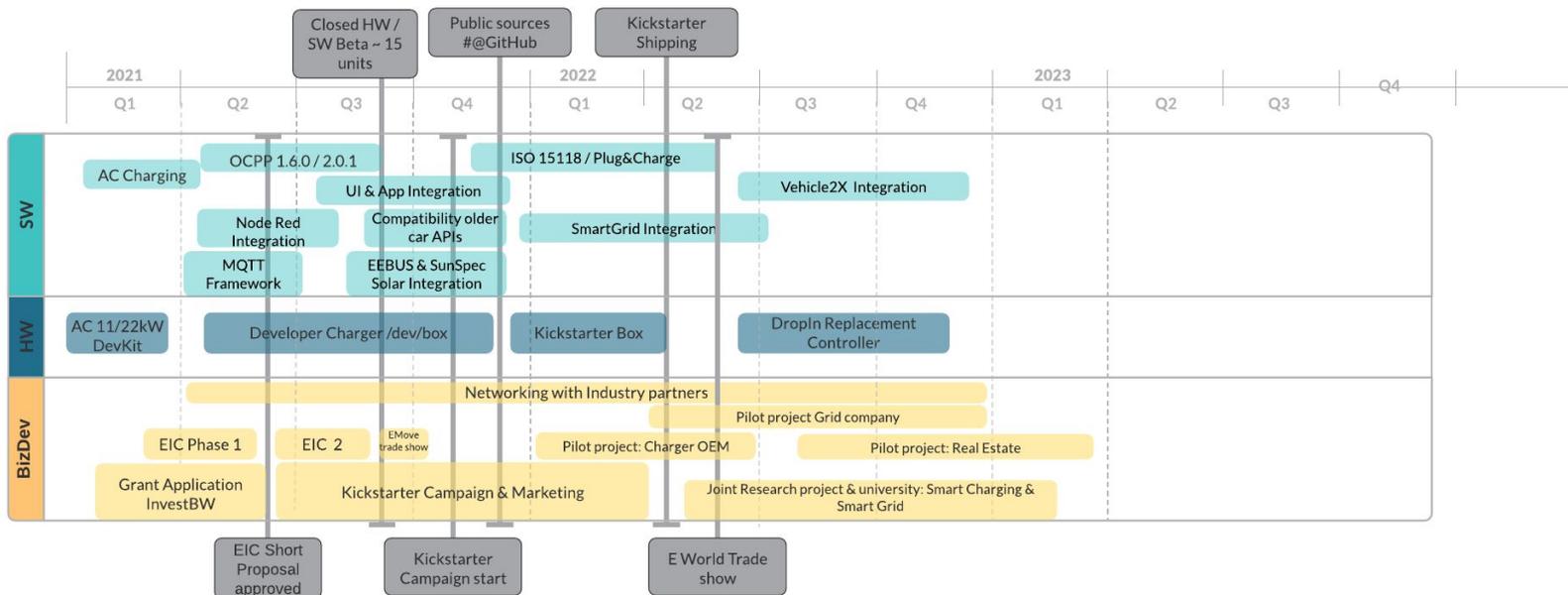


# Block Diagram

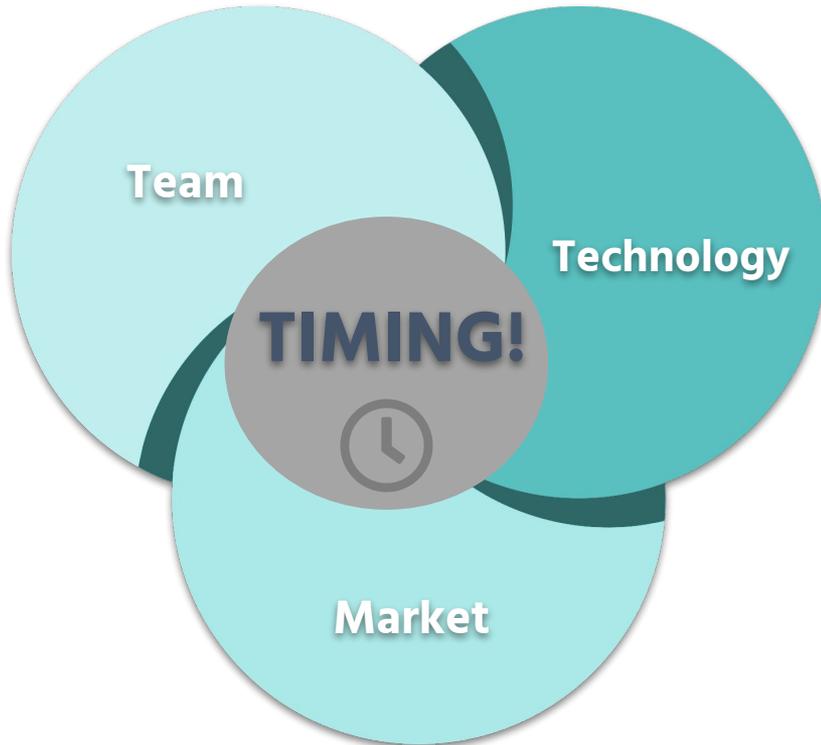
## Community Development Platform “/dev/box” V2



# >Timeline



## ›The Time is Right - One Main Reason for Success



**Currently:** Industry focussing on **closed source** solutions with many **downsides**

- Huge **growing market demand** for seamless integrated and available technology base layer
- In **many industries** proprietary **software stacks** are **phased out** into a commercially maintained **community open source base**.

With our joint **team experience**, we are spot on to **start this technology transition**

## ›EVERest is Depending on This Open Source Projects

Project name	Website	Use	License
nlohmann_json	<a href="https://json.nlohmann.me">json.nlohmann.me</a>	JSON parsing	MIT
nlohmann_json_schema_validator	<a href="https://github.com/pboettch/json-schema-validator">github.com/pboettch/json-schema-validator</a>	JSON schema validation	MIT
pal_sigslot	<a href="https://github.com/palacaze/sigslot">github.com/palacaze/sigslot</a>	Signal capabilities for C++	MIT
MQTT-C	<a href="https://liambindle.ca/MQTT-C">liambindle.ca/MQTT-C</a>	mqtt handling	MIT
date	<a href="https://github.com/HowardHinnant/date">github.com/HowardHinnant/date</a>	date handling	MIT
Qualcomm Atheros Open Powerline Toolkit	<a href="https://github.com/qca/open-plc-utils">github.com/qca/open-plc-utils</a>	low-level powerline communication	Clear BSD
Boost	<a href="https://www.boost.org">www.boost.org</a>	various helper libraries for C++	Boost Software License
RISE V2G	<a href="https://github.com/SwitchEV/RISE-V2G">github.com/SwitchEV/RISE-V2G</a>	communication with ISO15118	MIT
Node-Addon-API	<a href="https://github.com/nodejs/node-addon-api">github.com/nodejs/node-addon-api</a>	binding library for node.js	MIT
Node-RED	<a href="https://nodered.org">nodered.org</a>	interface for testing and evaluation	Apache License 2.0
WebSocket++	<a href="https://github.com/zaphoyd/websocketpp">github.com/zaphoyd/websocketpp</a>	websocket handling	3-Clause BSD
Sqlite3	<a href="https://www.sqlite.org">www.sqlite.org</a>	data persistence	Public Domain

⇒ EVERest is planned to be released under “Apache 2.0”  
(but flexible to change to e.g. MIT or BSD)

## ›Everest Implementing these Standards

Standard / Protocol name	Reference	Use	Terms & Conditions	Status
MODBUS RTU / TCP	<a href="http://www.modbus.org">www.modbus.org</a>	Communication with solar and other relevant devices	open	implemented
SUNSPEC	<a href="http://www.sunspec.org">www.sunspec.org</a>	Communication with solar and other relevant devices	open	implemented
ISO15118-X	<a href="http://www.iso.org">www.iso.org</a>	Vehicle to grid communication interface	doc:closed / implement: ?	preliminary implementation
Ocpp 1.6 / 2.0.1	<a href="https://www.openchargealliance.org/protocols/ocpp-201/">https://www.openchargealliance.org/protocols/ocpp-201/</a>	Chargepoint to cloud communication (admin + payment)	open	in implementation
EEBus	<a href="https://www.eebus.org/">https://www.eebus.org/</a>	Local Energy management	open	implementation research
awattar API	<a href="https://www.awattar.de/services/api">https://www.awattar.de/services/api</a>	Energy Pricing API		implemented
tibber API	<a href="https://developer.tibber.com/">https://developer.tibber.com/</a>	Energy Pricing API		implemented
forecast.solar	<a href="https://doc.forecast.solar/doku.php">https://doc.forecast.solar/doku.php</a>	Solar PV forecasting		implemented
MQTT	<a href="https://mqtt.org/">https://mqtt.org/</a>	IoT communication protocol	open	implemented
ADR	<a href="https://www.openadr.org/">https://www.openadr.org/</a>	flexible grid load mgmt	open	planned
USEF	<a href="https://www.usef.energy/">https://www.usef.energy/</a>	flexible grid load mgmt		planned

› Let's boost  
EVerest and LF Energy  
*together*



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+49 173 2051706

**PIONIX**

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PIONIX

# Appendix

# Open-Source in Commercial Business Models

taken from: Nauta Capital, VC company <https://nautacapital.com/open-source-is-eating-europe/>

# >IP Strategy

- Collaboration across industry currently happens by **standardization** committees  
⇒ **slow & buggy**
- **Collaboration** on the actual product would also provide standardization ⇒ **fast**
- Collaboration only flies with **open source**
- Important: Proper licencing!
- **Scaling & disseminating only by protecting less!**

## Licence Option:

### Commercial Licence:

- ✗ No community building

### GPL only:

- ✗ All derived work by our clients would need to be published  
⇒ Highly avoided in commercial usage

### Dual license: GPL + commercial

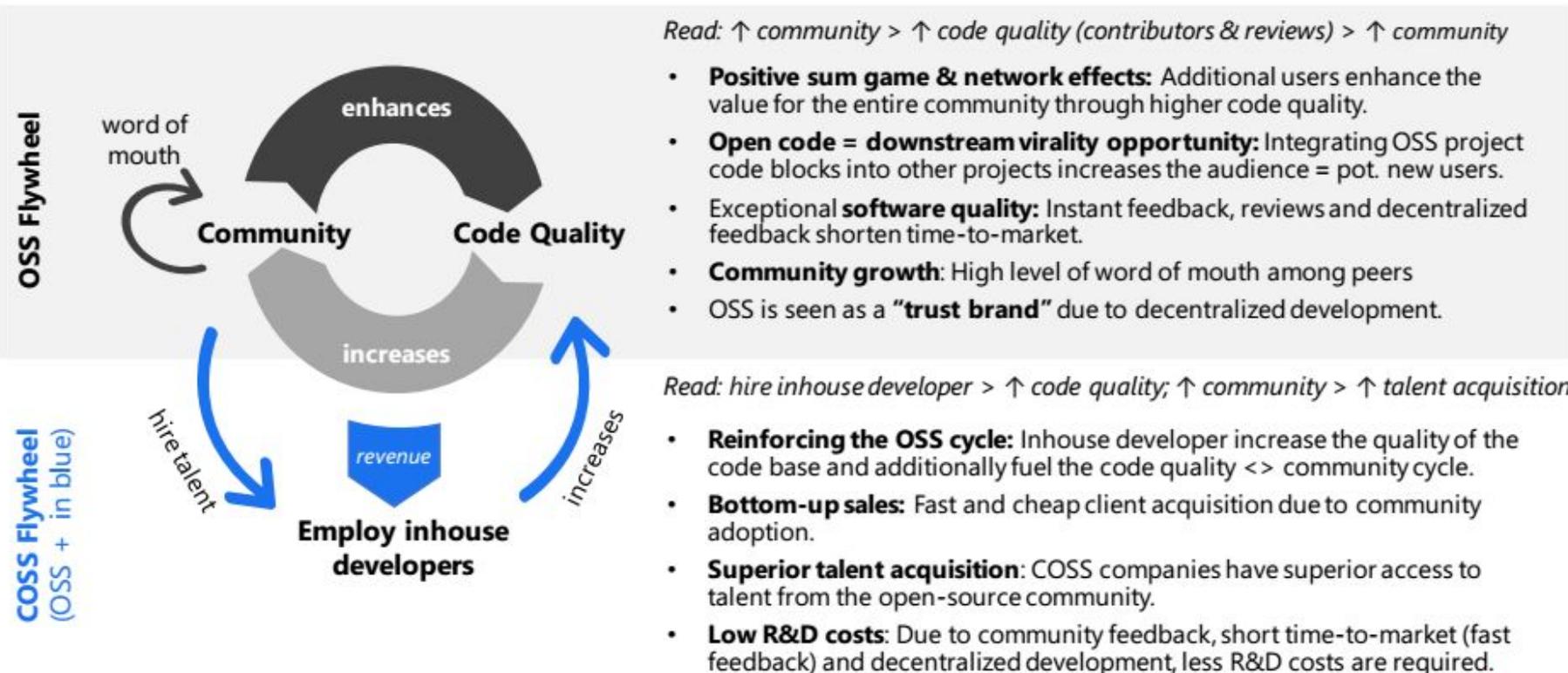
- ✗ Community contributions would become GPL code again, can't be licenced commercially  
⇒ Will be avoided by companies
- ✗ No community involvement possible ⇒ GPL contributions would not be commercially licenced

### MIT / BSD (entirely, or only for core components):

- ✓ Community could contribute
- ✓ No limitation to commercial usage
- ✗ No *direct* protection of Pionix IP  
⇒ mitigate by being core of community

# The OSS & COSS Flywheel: enabling exceptional business models

Interconnected COSS & OSS flywheels can power exponential, capital-efficient adoption rates and growth



# Monetization strategy for the commercialization of OSS

Five different, **yet often combined** options to successfully commercialize Open Source

	Services	Open Core	Open Core	Open Core	Multi-Licensing
<b>Free OSS vs. paid:</b>					
<b>Description</b>	Services incl. SLA, support etc. (can be recurring)	Various degrees of free OSS vs. proprietary	Hosting-as-a-service	Combination of multi-vendor OSS projects	Open code, commercial requires special license
<b>Challenges</b>	Scalability problems Potential conflict of support vs. code quality	Dual focus needed for: - Product-market fit - Code basis Deciding which features to include in free core	Risk of "forking" from cloud providers if offered without additional lock-in (see elastic search)	Defensibility, if layer of orchestration is too small	License In ≠ License Out Low acceptance in developer community Not pure "OSS" anymore
<b>Examples</b> (of the primary revenue source)					



# PIONIX Will Fix The Ecosystem

**EVERest** is the software that powers charging stations and wallboxes and offers a unified base layer

It is:

- **A Open Source Software Stack**
- Targeting **Commercial Applications**
- Fully Featured
- Extendable & Customizable
- Setting **De-Facto Standards**
- Running on Most Hardware
- Fast & Innovative
- Empowering Stakeholders
- Developed and Maintained by PIONIX and a **Growing Community**



EVERest is **NOT**:

- *Another Wallbox*
- *A Charging Provider*
- *A Payment Service*
- *A Cloud Service*
- *Vendor-Dependent*
- *Costly*
- *Proprietary*



# Transformed Many Industries

Industry focussing on **closed source** solutions with many **downsides**.



Huge **growing market demand** for seamless integrated and available technology base layer.



In many industries **proprietary software stacks** are **phased out** into a commercial **open source software (COSS) community**



# Everest

We will be the driver of this disruption in the EV industry

Proprietary Solution

*everyone develops on his own, many downsides*

Standardization

*everyone develops the same, but align how*

- Shortens development
- Reviewed by many developers
- Distributed community testing
- Avoids vendor lock in
- Utilization of external contributions
- Saves up to 55% costs

# Market Opportunity

## Global warming is driving market growth

Growing environmental concerns and rising demand for sustainable transportation

### Global infrastructure



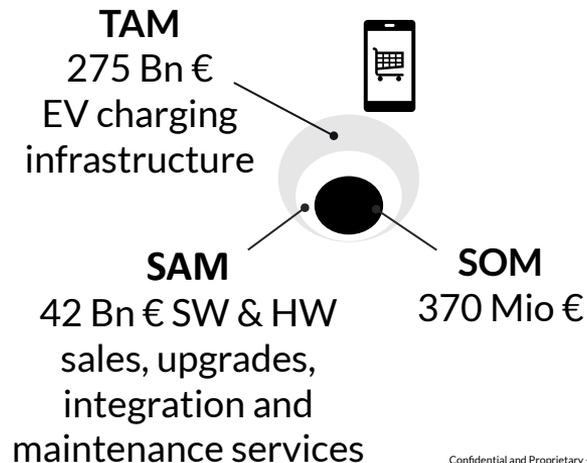
400 M cars  
480 M EV charging  
points by 2030

### Global electric vehicle charging station market



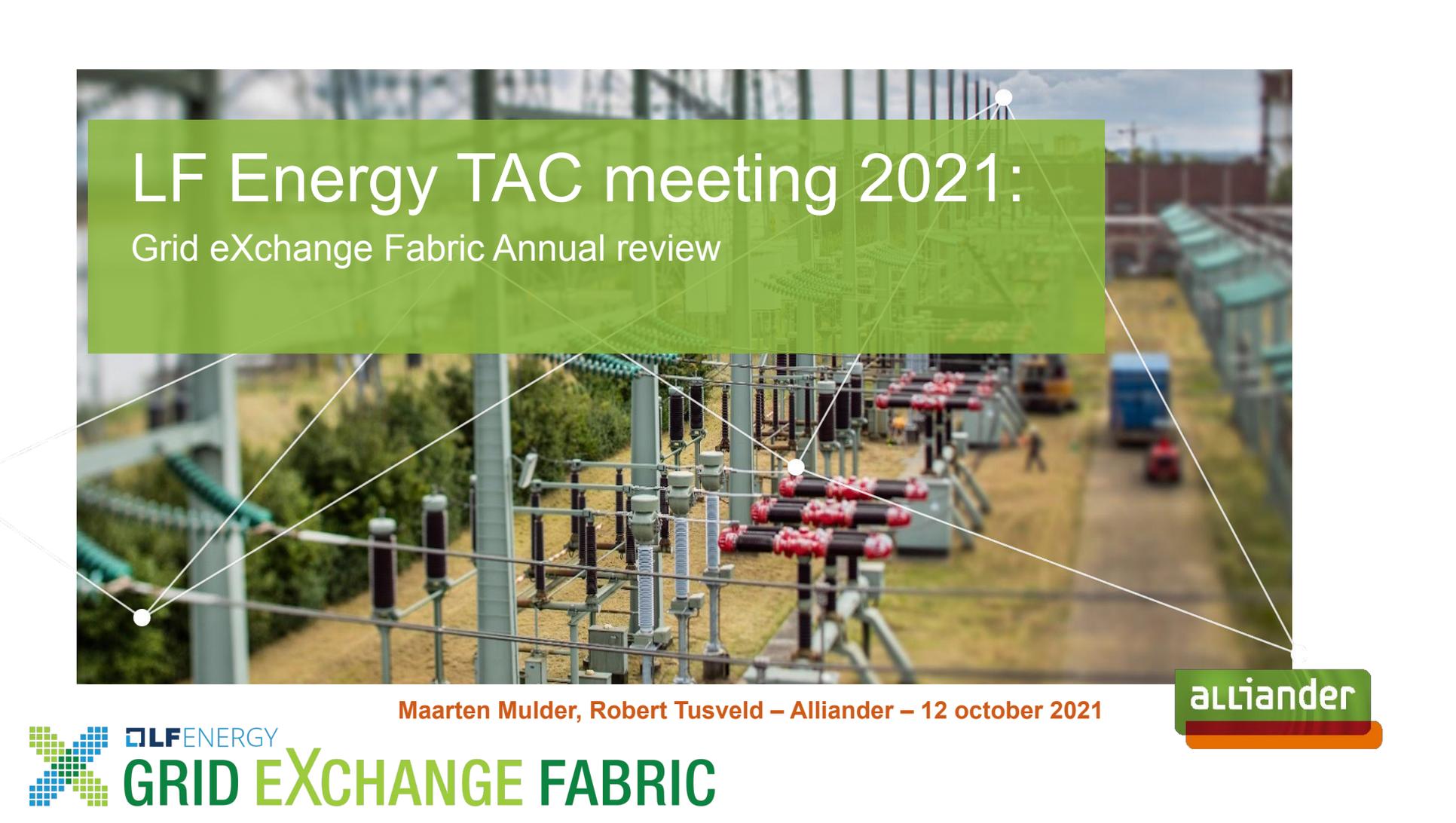
113.2 B € by 2027  
46.6% CAGR

### Markets by 2030



# GXF annual review





# LF Energy TAC meeting 2021:

## Grid eXchange Fabric Annual review

Maarten Mulder, Robert Tusveld – Alliander – 12 oktober 2021

allliander

# Grid eXchange Fabric

The logo for Alliander, featuring the word "alliander" in white lowercase letters on a green rectangular background with a dark green horizontal bar below it.

## Brief Description:

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..

**Current stage:** Early Adoption and we are not aiming for the Graduated stage for this review.

## Contributed by:

*Alliander*

## TSC Chairperson:

Robert Tusveld <[Robert.Tusveld@alliander.com](mailto:Robert.Tusveld@alliander.com)>

## TSC Members and Affiliations:

Maarten Mulder - Product Owner

Robert Tusveld - Lead Architect - Chairman

Paul Houtman - Lead Architect

Kevin Smeets - Maintainer

LF Energy TAC member – Jonas van den Bogaard (a.i.)

# Key links

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

**Website:** <https://www.lfenergy.org/projects/gxf/>

**Wiki:** <https://wiki.lfenergy.org/display/HOME/Grid+eXchange+Fabric+-+GXF>

**Technical documentation:** <https://grid-exchange-fabric.gitbook.io/gxf/>

**Webinar:** <https://www.youtube.com/watch?v=zH9CdMH0tUM>

**Mailing lists:** [GXF-general](#)

**CII Badge URL:** <https://bestpractices.coreinfrastructure.org/en/projects/4104>

# Agenda

- Current activities
- Assessment
- Roadmap
- Feedback on its experience as an LF Energy project

# Current activities

include releases, adoption, and committer/contribution growth and diversity

alllander

## - Releases for Public Lighting

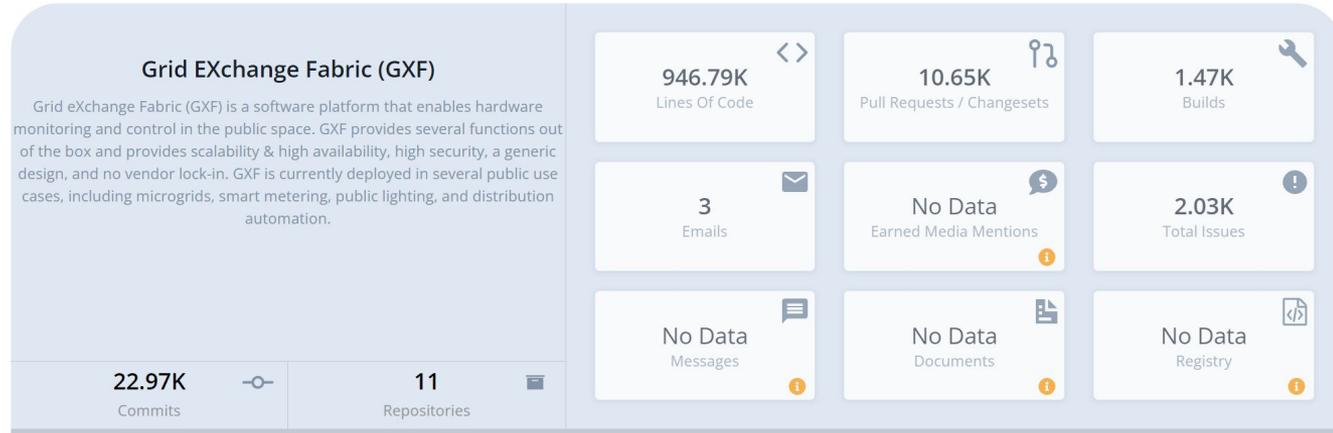
- Light metering
- Connection with corporate API
- CMDB connection via Kafka

## Releases for Low Voltage Measurements

- MQTT adaptor implementation South
- Kafka adaptor North
- Dockerization of GXF
- Openshift implementation

## Releases for Smart Meter Head End

- Development DLMS protocol adapter
- Stabilizing GXF

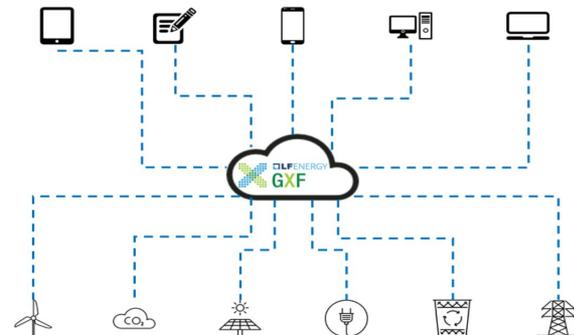


- The project is in control of issue
- Stable contributors
- Continuous flow of commits

# Alliander Use-cases



## Overview



20.000 devices in production

## Public Lighting



200.000 devices and scaling up to 6.000.000 meters

## Smart Metering

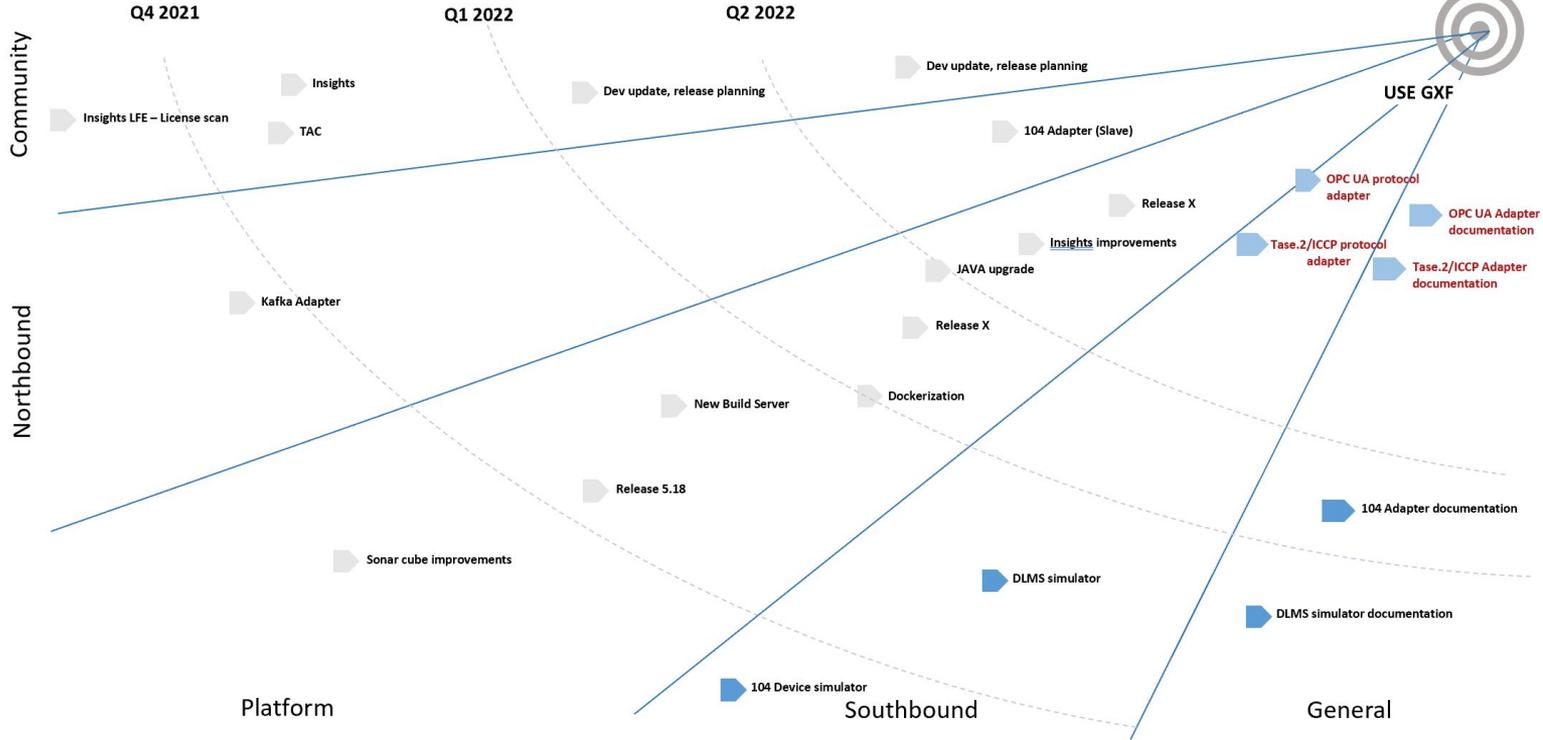


250 devices in a new DA chain via MQTT

## Low Voltage Measurements



# Roadmap GXF



# Assessment

## Graduated stage

**Current stage:** Early Adoption and we are not aiming for the Graduated stage for now.

**To graduate to Graduated status, a project must meet the Early Adoption stage criteria plus:**

Have a defined governing body of at least 5 or more members (owners and core maintainers), of which no more than 1/3 is affiliated with the same employer. In the case there are 5 governing members, 2 may be from the same employer.

Our TSC currently has 4 voting members: Robert Tusveld - Architect – Chairman, Paul Houtman - Lead Architect, Kevin Smeets – Maintainer, LF Energy TAC member – Jonas van den Bogaard (a.i.)

Have fulfilled or are on track to complete the growth plan defined in the Early Adoption stage proposal.

No, we have to formally define a growth plan.

Have a healthy number of contributions or committers from at least three organizations, with any single organization not composing more than 50% of the contributions or committers. Committers must be identified within the project in a COMMITTERS file.

We have commits from some external contributors, but Alliander still makes up over 90 % of the contributions. No COMMITTERS file.

Have a public list of project adopters for at least the primary repo (e.g., ADOPTERS.md or logos on the project website).

Yes, see: <https://wiki.lfenergy.org/display/HOME/GXF+Usage+in+Real-World+Applications>

Achievement of the Core Infrastructure Initiative Best Practices badge at the Gold level.

Badge at Passing level

# Feedback on its experience as an LF Energy project

## Discussions

- Internal discussion about availability of resources and time for LFE activities
- Possibility to have cooperation with the DSO in the Netherlands through LFE
- Closed source applications at Alliander

## Positive feedback

- Insights dashboards
- LFE wiki
- Support for the project

### License Scan report

Project: **lfenergy**  
Subproject: **gxf**  
Snapshot on: **2021-09-24** (show repos)

#### Key findings:

Finding #1  
Priority: **High**  
This repo contains one or more other files with compiled binary / object code. We would strongly recommend pulling in dependencies at build-time rather than distributing them in the source repos. Or, if they contain the project's own compiled binary / object code, we would not recommend distributing them within the source code repo itself, and instead configuring to compile it at build time.  
**153 files** (show files)

Finding #2  
Priority: **High**  
This README file refers to jDLMS, a project licensed under GPLv3. Is any jDLMS code incorporated into the repo? Even if jDLMS exists separately, we may need to discuss code in the repo which interfaces with jDLMS.  
**2 files** (show files)

Finding #3  
Priority: **Medium**  
This file indicates that it is under the OpenSSL license, which includes an "advertising clause" requirement. Is it possible to remove these from the repo?  
**2 files** (show files)

# Questions

Thank you for your interest in the Grid eXchange Fabric

allander



# Green Energy DataHub project proposal



# GREEN ENERGY HUB





---

WHY?

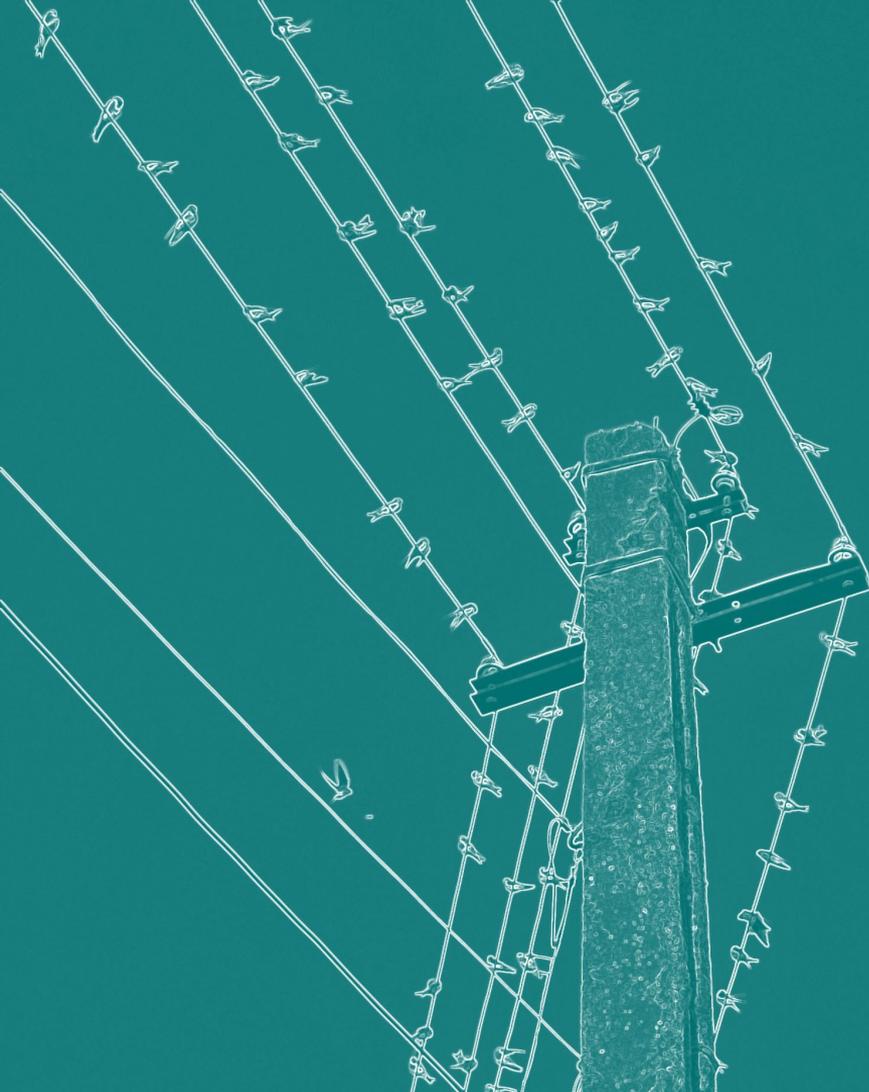
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# GREEN ENERGY FOR A BETTER WORLD



# WE SEE AN OPPORTUNITY TO ACCELERATE INNOVATION, QUALITY AND PACE OF DEVELOPMENT THROUGH OPEN COLLABORATIONS

- . BY SETTING ENERGY DATA FREE WE CAN SUPPORT THE GREEN TRANSITION GLOBALLY
- . AN OPEN SOURCE DATAHUB CAN CONTRIBUTE TO SOLVE THE GREEN TRANSITION



## WHAT?

- . A PLATFORM TO SUPPORT THE MARKET DRIVEN PROCESSES
- . A TOOL FOR SHARING ENERGY DATA

# CORE UTILITIES

## WE NEED TO SOLVE IN THE DANISH MARKET



Meter Data Management

Metering Point Management



Consumer Management



Business Process

Market Roles



Charges

Billing & Settlement

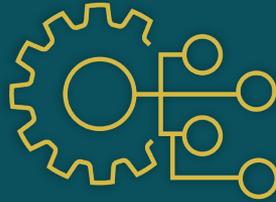


Data Access



# SUPPORTING MARKET PROCESSES BASED ON THE COMING CIM-STANDARD

- . ALL INTERNAL AND EXTERNAL MESSAGES ARE BASED ON THE CIM HARMONIZED ROLE MODEL
- . PROCESSES ARE BASED ON CIM USE CASES LIKE: RequestMovein, RequestMoveOut



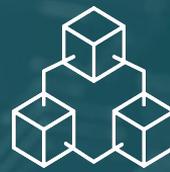
# HOW?

A CLOUD BASED PLATFORM THAT SUPPORTS SMALL AND LARGE MARKETS

MICRO SERVICE LANDSCAPE

AZURE

# THE MOST IMPORTANT MICRO SERVICES



COMBINED DATASET  
FOR ANALYSIS AND  
DATA SHARING:

**SETTING DATA  
FREE**

## METERING

### POINTS

PROCESS  
MANAGEMENT  
FOR CREATING  
AND UPDATING  
METER  
INFORMATION

## MARKET ROLES

SUPPLIER AND  
CUSTOMER  
INFORMATION  
ON METERS:  
· MOVE IN/OUT  
· CHANGE SUPPLIER

## CHARGES

HANDLING:  
· FEES  
· SUBSCRIPTIONS  
· PRICES

## TIMESERIES

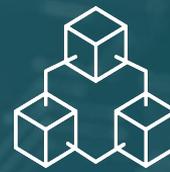
RETRIEVAL OF  
TIMESERIES IN 5  
MINUTES  
RESOLUTION  
FOR 38 MIO.  
METERS

## AGGREGATIONS

CALCULATES  
AGGREGATED  
VALUES FOR  
BILLING AND  
CONSUMPTION

# THE BASIC MICRO SERVICES

EVENT DRIVEN DESIGN



COMBINED DATASET  
FOR ANALYSIS AND  
DATA SHARING:

**SETTING DATA  
FREE**

## METERING

### POINTS

PROCESS  
MANAGEMENT  
FOR CREATING  
AND UPDATING  
METER  
INFORMATION

## MARKET ROLES

SUPPLIER AND  
CUSTOMER  
INFORMATION  
ON METERS:  
. MOVE IN/OUT  
. CHANGE SUPPLIER

## TIMESERIES

RETRIEVAL OF  
TIMESERIES IN 5  
MINUTES  
RESOLUTION  
FOR 38 MIO.  
METERS

# DESIGN GOALS

## - AZURE IS OUR PLATFORM (FOR NOW)

- . BUILD FOR THE CLOUD WITH CLOUD SERVERLESS SERVICES
  - . LESS MAINTENANCE WORK WITH SERVER PATCHING AND UPDATES
  - . NO NEED FOR MONITORING AND UPDATING HARDWARE
  - . EASY TO SCALE WITH THE INCREASING AMOUNT OF DATA
- . CRITERIA FOR SELECTING SERVICES
  - . OPEN SOURCE IS PREFERRED
  - . MUST BE SERVERLESS
  - . POSSIBILITY TO USE OTHER CLOUD VENDORS

**QUESTIONS?**

# OpenEEMeter/EM2 annual review





TAC Annual Review  
OpenEEmeter

The current activity of the project, including releases, adoption, and committer/contribution growth and diversity.

- [Releases](#): 2.10.11, 3.0.0, and 3.1.0 = Bug fixes and adaptations of the methods for example:
  - Update `fit_temperature_bins` to potentially take an `occupancy_lookup` in order to fit different temperature bins for occupied/unoccupied modes. *This changes the args passed to `eemeter.create_caltrack_hourly_segmented_design_matrices`, where it now requires a set of bins for occupied and unoccupied temperatures separately.*
  - Update CalTRACK hourly model formula to use different bins for occupied and unoccupied mode.
- Most Committers and Contributors are still from Recurve team.
- Adoption of method + code base grown across U.S. utilities; and companies reliant on calculations for performance payment. (see next slide)

# OPENEEMETER is the foundation for Demand Flexibility Performance Transactions

## Utility Demand Flexibility Buyers



## Demand Flexibility Providers

<p><b>BlocPower</b> Increase your building's profitability with a modern heating and cooling system.</p>	<p><b>BRIGHT POWER</b> Bright Power is the premier provider of energy and water management services.</p>	<p><b>CARBON LIGHTHOUSE</b> Cut Energy at a Florida Scale. Because one building at a time doesn't cut it.</p>	<p><b>CH Energy</b> CH Energy is an expert in providing a turnkey energy solution.</p>	<p><b>CLEAResult</b> We make energy efficiency simpler, faster, and more accessible for everyone.</p>	<p><b>OhmConnect</b> Use energy when it's cheapest and earn rewards for saving when it's dirty.</p>
<p><b>Conectric</b> Operational Asset Risk Management.</p>	<p><b>DIVIDEND</b> A smarter, faster way to finance home improvements and commercial upgrades.</p>	<p><b>ecobee</b> A smart home technology helping customers measure comfort and cost savings.</p>	<p><b>EcoGreen</b> EcoGreen Solutions We help companies save energy and cut costs.</p>	<p><b>Ecology Action</b> Ecology Action is creating a thriving environment and low-carbon economy.</p>	<p><b>PACKETIZED ENERGY</b> Packetized Energy makes electricity flexible.</p>
<p><b>edgewise energy</b> Helping property owners to improve resiliency, sustainability, and profit.</p>	<p><b>ELECTRUM</b> Electrum provides a home electrification concierge marketplace.</p>	<p><b>Elevation Home Energy Solutions</b> We are on a mission to Elevate the Home Energy Experience.</p>	<p><b>ECO</b> Energy Conservation Options (ECO) Drives Mission: Independent, owner-owned &amp; stable licensed firm offering C&amp;E energy management.</p>	<p><b>ERI</b> Energy Resilience Management Developing Sustainability through Energy Efficiency.</p>	<p><b>Sealed</b> Sealed: Smart-free home upgrades? With Sealed, they're not just a fantasy.</p>
<p><b>ev energy</b> A vehicle platform that connects to EVs and EVSEs to deliver load flexibility.</p>	<p><b>EVERWATT</b> Stop wasting money on old lighting.</p>	<p><b>FlexCharging</b> Electric Vehicles use here. Save money AND carbon emissions. It's EASY.</p>	<p><b>Geneti Energy Solutions</b> Geneti Yields Geneti is democratizing the energy stack stack.</p>	<p><b>GROUSE ASSOCIATES</b> Grouse Associates Experts in reducing embedded energy in your HVAC system.</p>	<p><b>swell</b> Swell Energy Swell Energy is an energy and smart grid solutions provider.</p>
<p><b>Helo</b> Helps in building residential and commercial energy services provider in NY.</p>	<p><b>HomeWorks Energy</b> We simplify energy conservation and solve home energy efficiency challenges.</p>	<p><b>Joule Smart</b> Joule Smart will save you time, money, and give you peace of mind.</p>	<p><b>leap.</b> Leap Leap is a marketplace for grid services, to help balance the grid.</p>	<p><b>NBSA</b> National Resource Management If your business relies on refrigeration systems, NBSA has a way to help you.</p>	<p><b>voltage</b> Voltage Better Energy. More Cash.</p>

*Assessment of whether the project is fulfilling the requirements for the project to remain at its current stage, or be considered for a different stage*

- Have an open and documented technical governance, ✓
- Complete and approve the Technical Charter and agree to transfer any relevant trademarks to The Linux Foundation or its affiliate, LF Projects, LLC, and to assist in filing for any relevant unregistered ones. ✓
- Have achieved and maintained a Core Infrastructure Initiative [Best Practices Badge](#) at the 'Passing' level.
- Have had a successful license scan with any critical issues remedied. ✓
- Have a defined project mission and scope ✓
- An overview of the project's architecture and features defined. ✓
- A project roadmap defined, which should address the following questions. ✓
- Community and contributor growth assessment
  - The current number of contributors and committers (28), and the number of different organizations (2-3)
  - Demonstrate a sustained flow of commits / merged contributions ✓
  - A credible plan for developing a thriving user community, in particular expanding the number of committers and contributors? [-]
  - Outline of the plan for the project to complete the requirements for Adopted Stage [-]
- Receive the affirmative majority vote of the TAC. [Purpose of Today's Meeting]

*Feedback on its experience as an LF Energy project, including benefits from being an LF Energy project and areas that the TAC and LFE staff can better support the project.*

- **Experience as an LF Energy project has been positive.**
  - Provides reference point of "acceptance" for the market
  - Provides access point for the industry from a trusted source
  - Policy positioning for open-source transparency
- **Key Benefits are both for the project but also for the company**
  - Branding
  - Nudging
  - Community with other projects
- **TAC / LFE Staff can support with considering transition, and promoting new model**
  - OpenEEmeter standing alone just doesn't do much
  - Scattered governance for multiple open-source methods and code
  - Bringing it under a single umbrella will help but still questions about how methods and code can best co-habitate in an LFE project

# OPENEEMETER Friends & Family



OPENEEMETER



CALTRACK



OPEN GRID METER



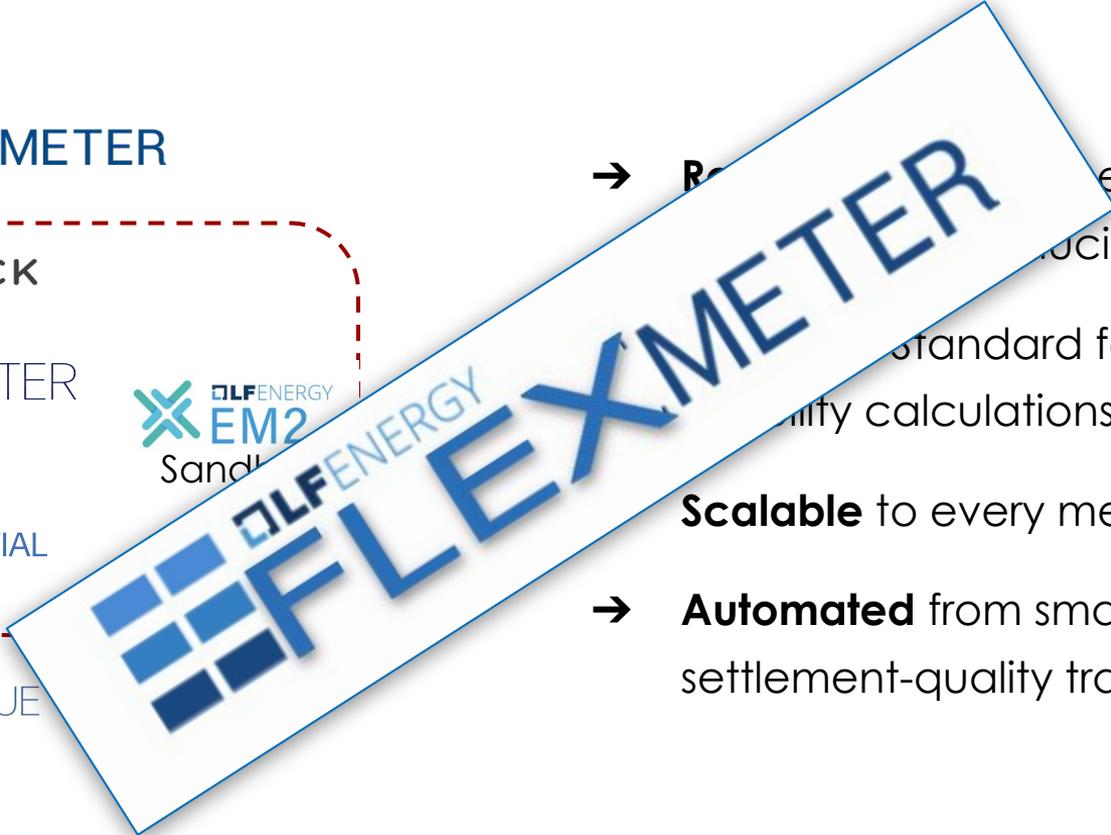
EM2  
Sand



ENERGY DIFFERENTIAL PRIVACY



FLEX VALUE



→ Renewable energy source, accessible

Standard for demand response calculations

**Scalable** to every meter on the grid

→ **Automated** from smart meter data to settlement-quality transaction

# Project Review Cycle

Project	Current Level	Initially Accepted	Last Review Date	Next Review Date
OpenEEmeter	Incubation	June 4, 2019		October 12, 2021
EM2	Early Adoption	June 4, 2019		October 12, 2021
GXF	Early Adoption	February 4, 2020		October 12, 2021
<b>SEAPATH</b>	<b>Incubation</b>	<b>October 6, 2020</b>		<b>November 2, 2021</b>
OpenLEADR	Incubation	September 15, 2020		November 23, 2021
Hyphae	Incubation	December 8, 2020		December 14, 2021
FledgePOWER	Incubation	February 11, 2021		February 15, 2022
SOGNO	Early Adoption	October 27, 2020	March 16, 2021	March 8, 2022
Shapeshifter	Incubation	April 6, 2021		March 29, 2022
Grid Capacity Map	Incubation	April 27, 2021		April 19, 2022
OperatorFabric	Early Adoption	April 30, 2019	July 20, 2021	July 12, 2022
CoMPAS	Incubation	May 5, 2020	June 29, 2021	July 12, 2022
PowSyBI	Early Adoption	April 30, 2019	August 31, 2021	August 23, 2022

# Agenda

## Opening (5 Minutes)

- Summary of last TAC meeting & Updates from the Board Meeting
- Upcoming community meetings of interest
- Landscape updates

## TAC Business (80 Minutes)

- EVerest project proposal
- GXF annual review
- Green Energy DataHub project proposal
- OpenEEMeter/EM2 annual review

## Closing and next meeting (5 Minutes)

# Next TAC Meeting

The next meeting of the LF Energy TAC is scheduled for 2 November 2021 at 8:00 am US Pacific Time/11:00 am US Eastern Time/5:00 pm Central European Time.

Agenda will include:

- Recap of last TAC meeting/Governing Board updates
- SEAPATH annual review
- FlexMeasures project proposal



Thank you!