

# **wnTech**

## **Open Digital Power**

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# Team



## **Dr. Luiz VILLA**

Associate professor  
University of Toulouse  
PhD in power electronics

More than ten years of research on software defined power electronics in collaboration with industrial partners, NGOs and fablabs.

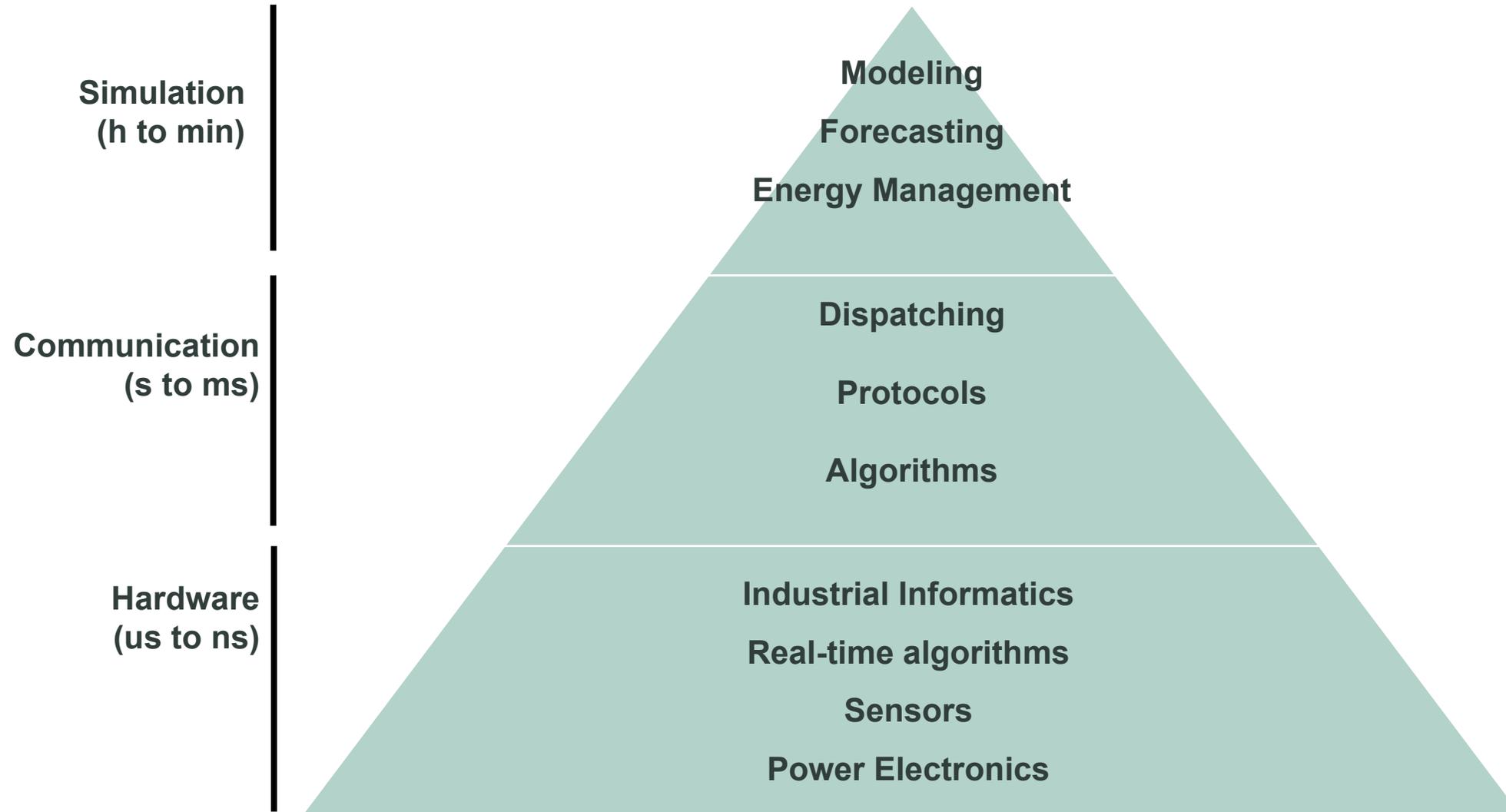
## **Jean ALINEI**

M.Eng Grenoble INP -  
Product design and  
Innovation management

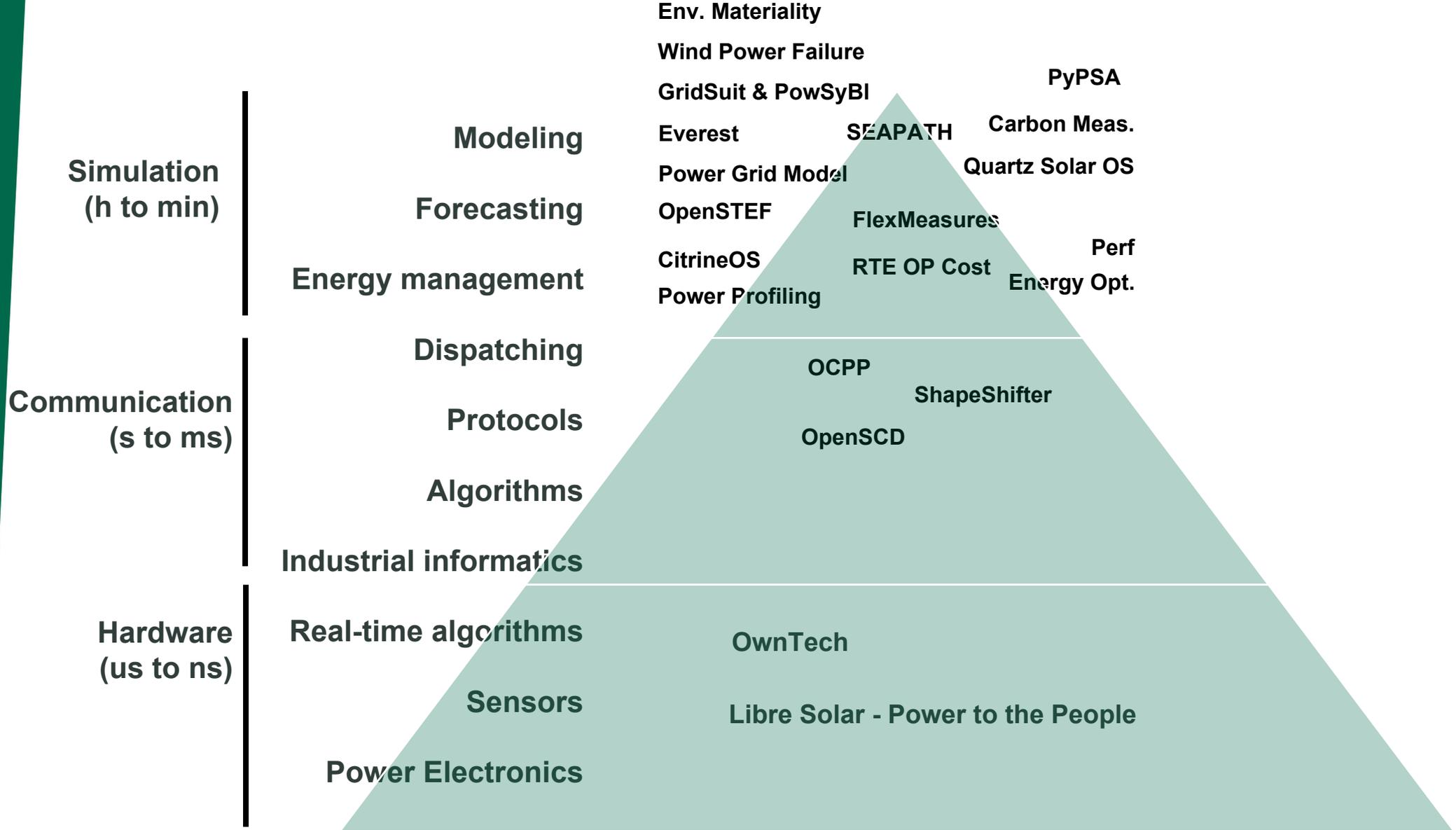
More than eight years of commitment in different non-profit organizations and fablabs centered on open source technology, capacity training and empowerment.



# The Energy Pyramid



Energy: Reimagining this Ecosystem through Open Source DevRoom



Energy: Reimagining this Ecosystem through Open Source DevRoom

# The Energy People

Simulation

Communication

Hardware

*Today we have the bricks, tomorrow we'll build pyramids.  
We, the energy people, have the power to change the world !*

# Hardware is hard, until it isn't...

2005



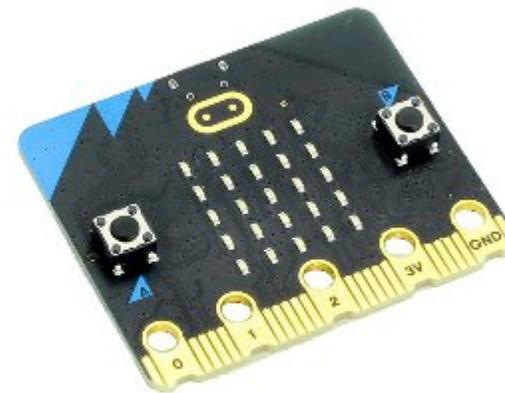
**Arduino** has made industrial informatics accessible to everyone

2008



**Raspberry pi** has made informatics accessible to everyone

2015



**Micro:bit** allowed children to learn how to code

2023



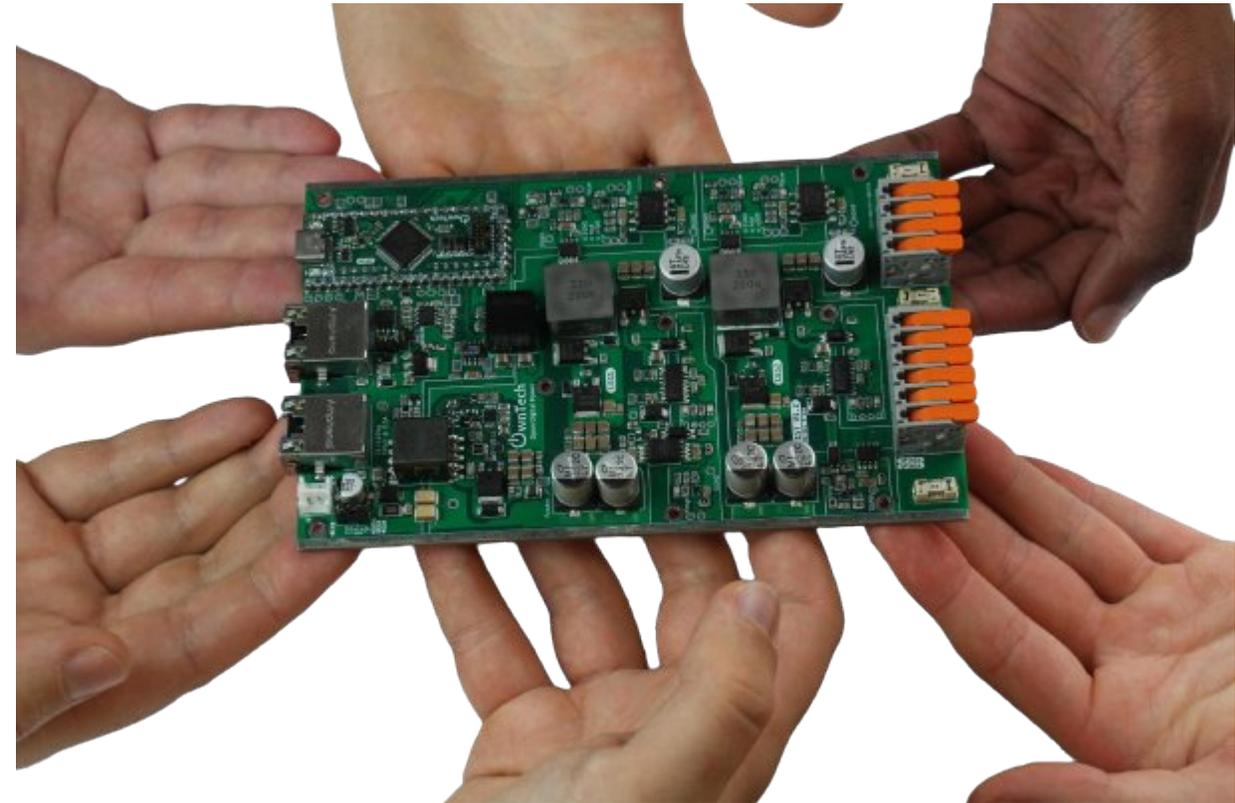
**OwnTech** will make power electronics accessible to everyone

# OwnTech has a solution



Demand for power electronics is continuously growing while there is no technological mean to streamline training and foster innovation

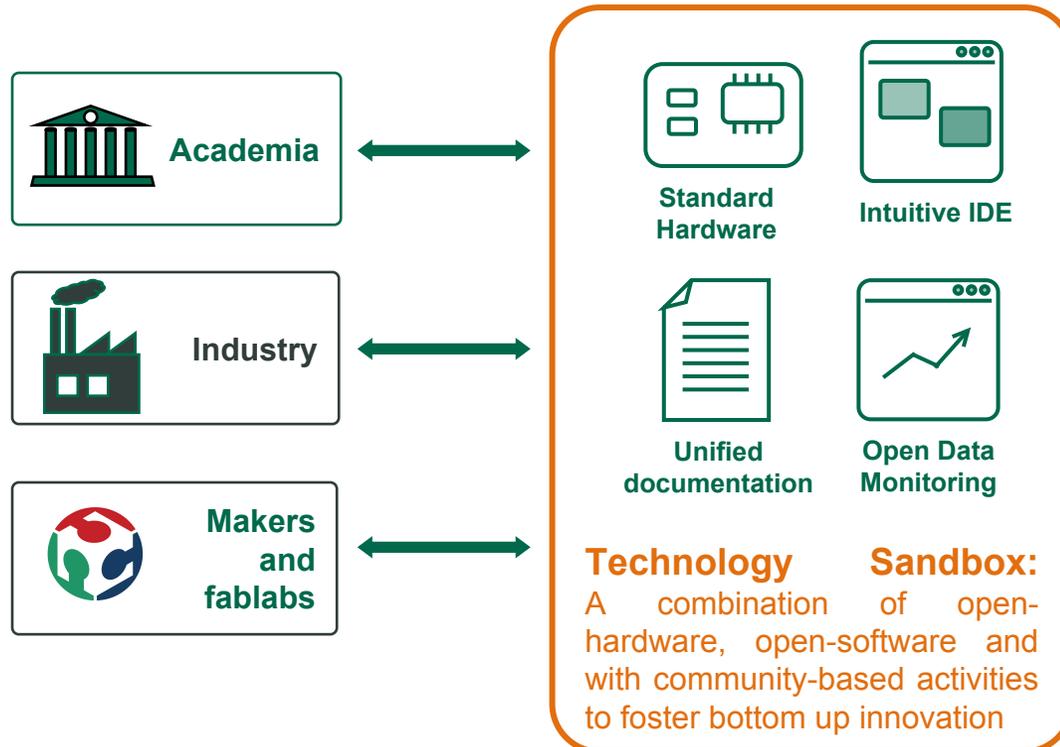
**OwnTech proposes a community-based revolutionary compact, versatile, open-source and low cost technology for learning and prototyping power electronics.**



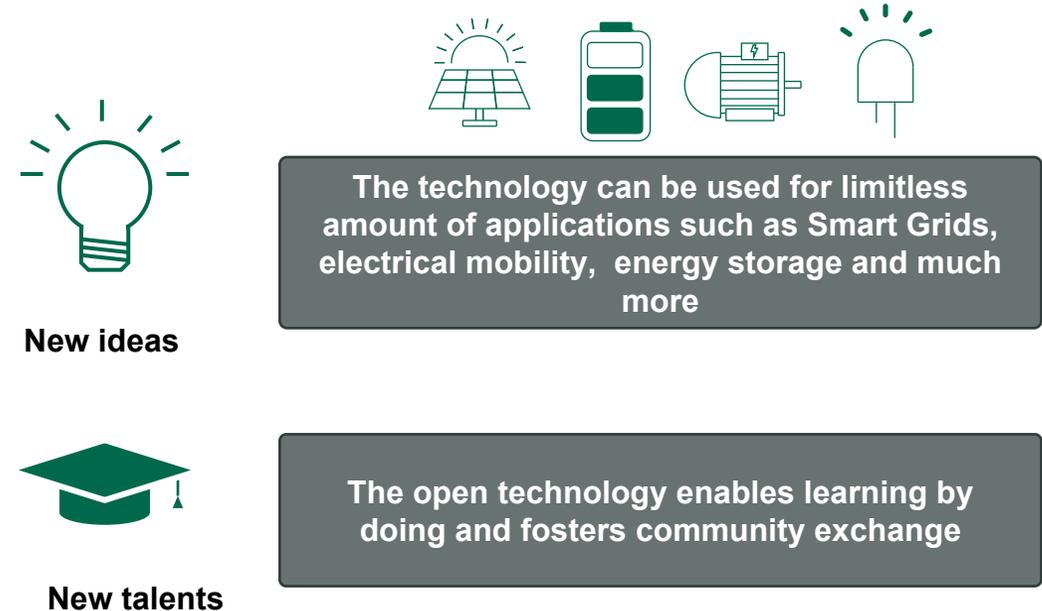
# OwnTech is a Technology Sandbox

OwnTech user-centric technology sandbox provides all elements to foster a community of users and developers

The OwnTech foundation ensures open and fair access to the technology sandbox

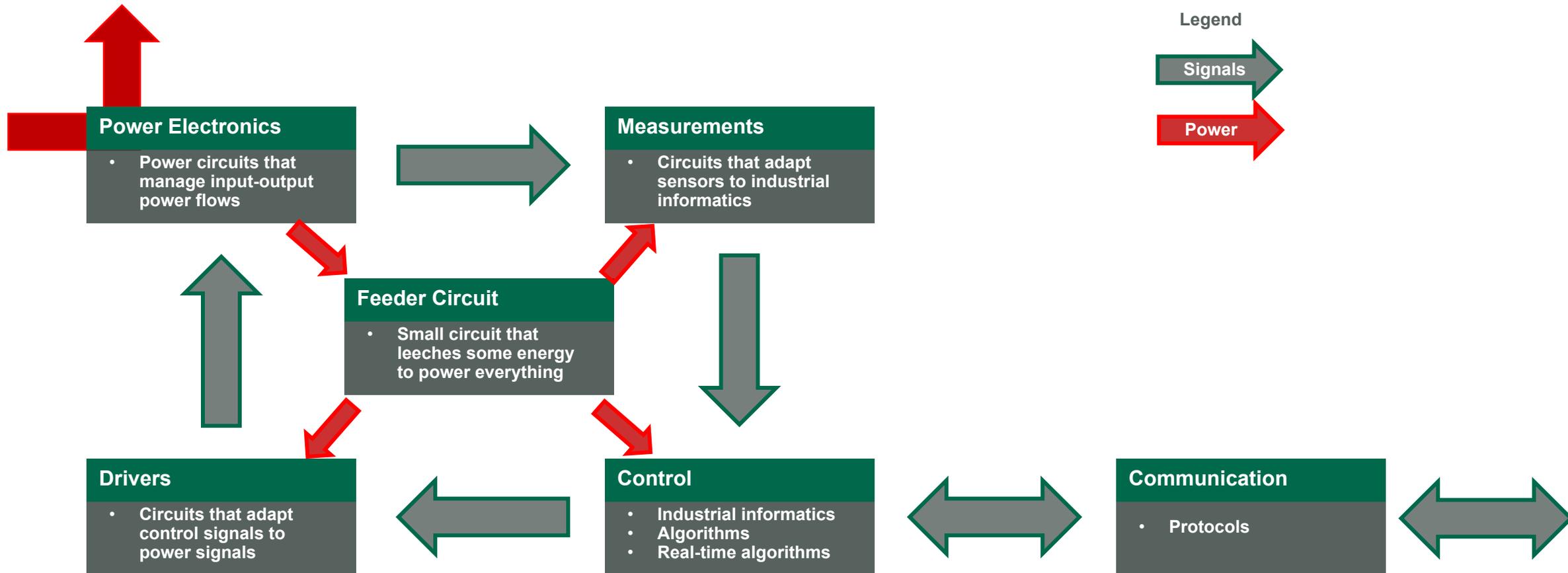


This fertile open sandbox produces impact

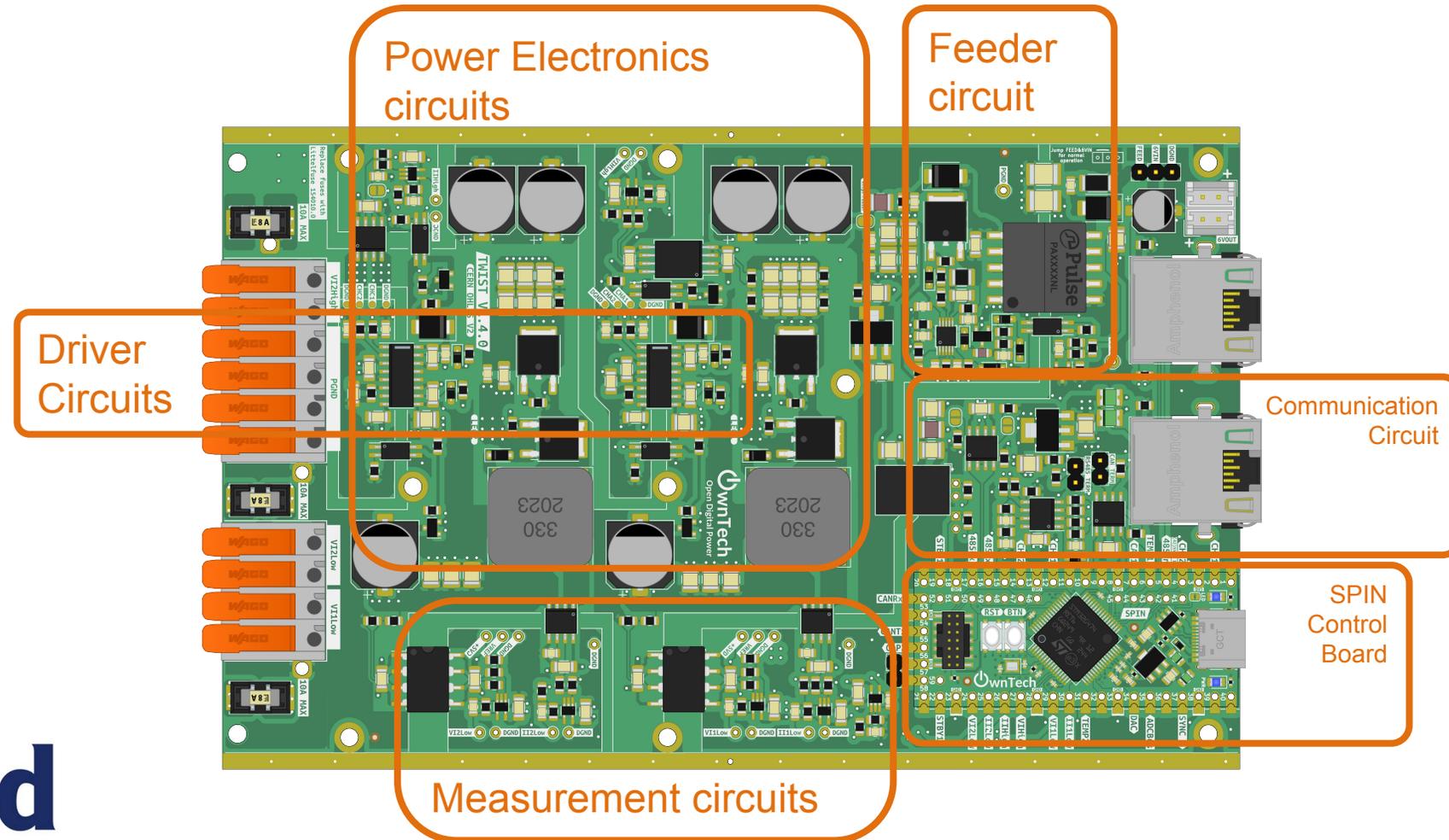


Energy: Reimagining this Ecosystem through Open Source DevRoom

# Power Hardware – Some basics



# The TWIST Board: Multi-disciplinary hardware education platform



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# The TWIST Board: stackable power

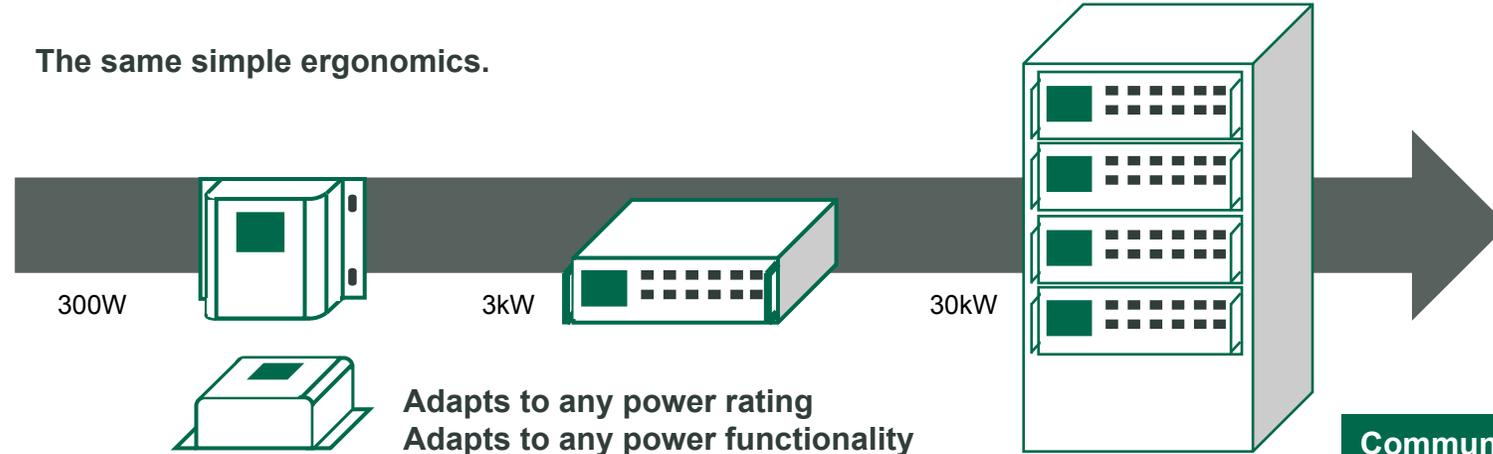
## A standard power module



- 300W per module
- Compact 160x100mm form factor
- Optimized for fab'

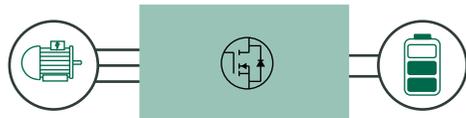
As a stand alone module..

The same simple ergonomics.



Adapts to any power rating  
Adapts to any power functionality

## Use case example for Industry



Control engineers setting up their test benches in short periods of time. They are also seamlessly changing their models and reprogramming the converter to control their target application.

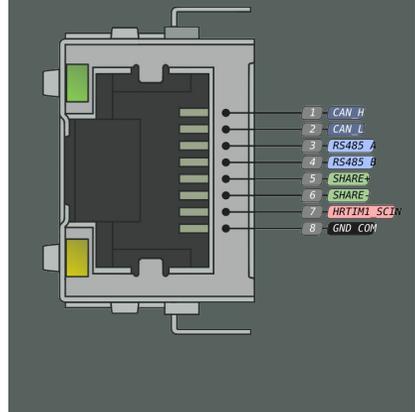
CANBus for Housekeeping

RS485 for fast communication

Analog ultra-fast communication

Real-time Synchronization Pin

## Communication system on an RJ45 cable



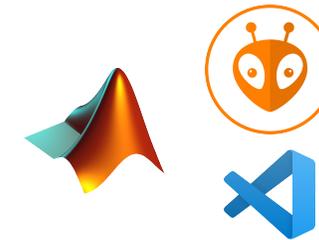
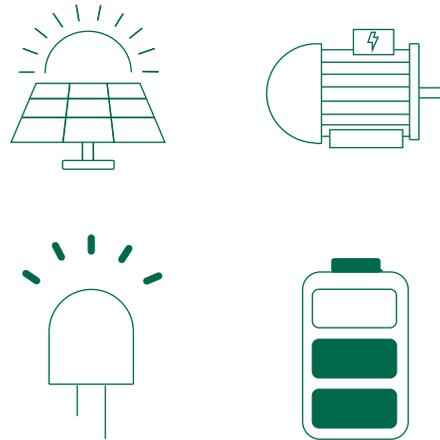
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# The SPIN Board: Versatile control

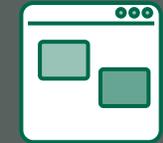
## A standard control module



- High Resolution PWM
- Flexible API
- 12bit ADC
- IoT ready



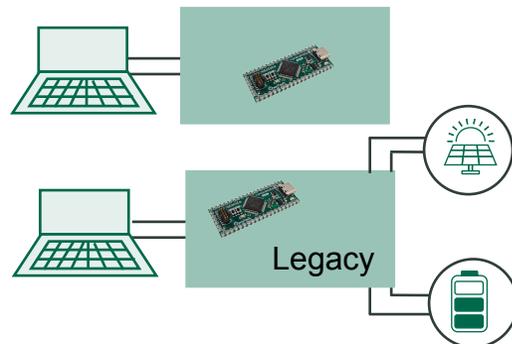
## A standard software suite



Intuitive IDE

- Matlab compatible
- C-Code based
- Zephyr OS based
- Modular and open

## Use case example for Education



Instructors can easily upload their models to the spin board and test algorithms and control theory with students. Legacy hardware can still be used.

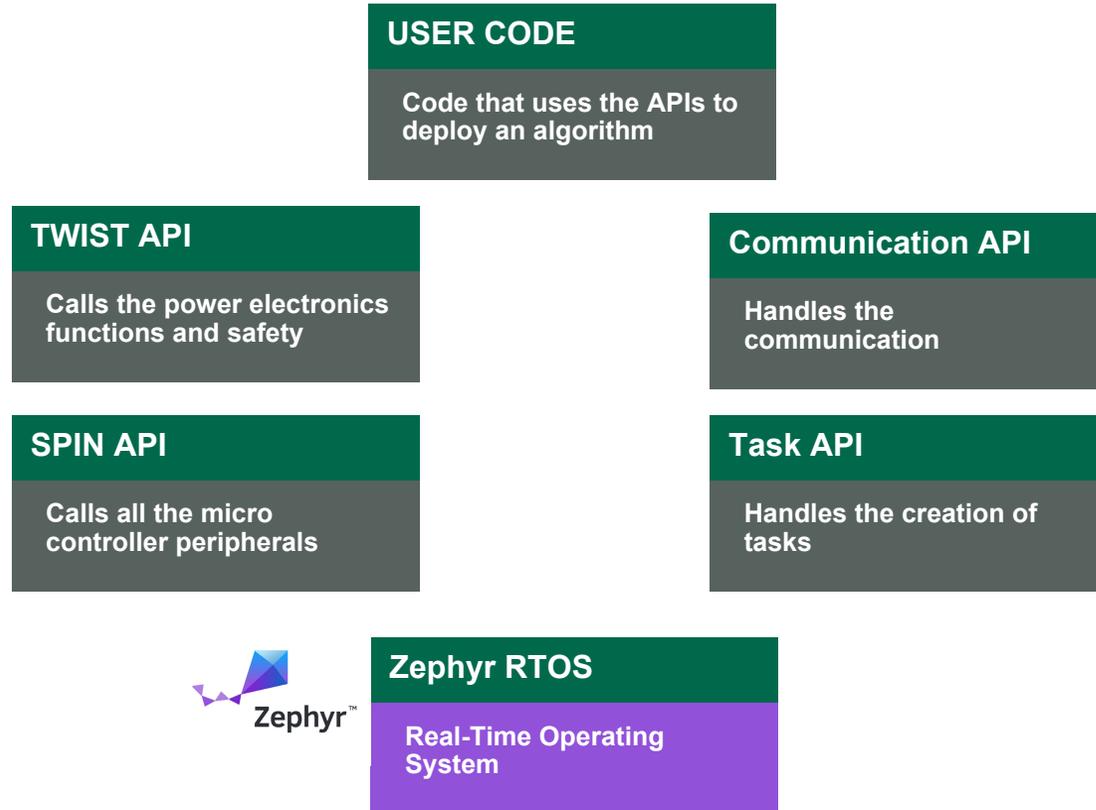
## Use case example for Industry



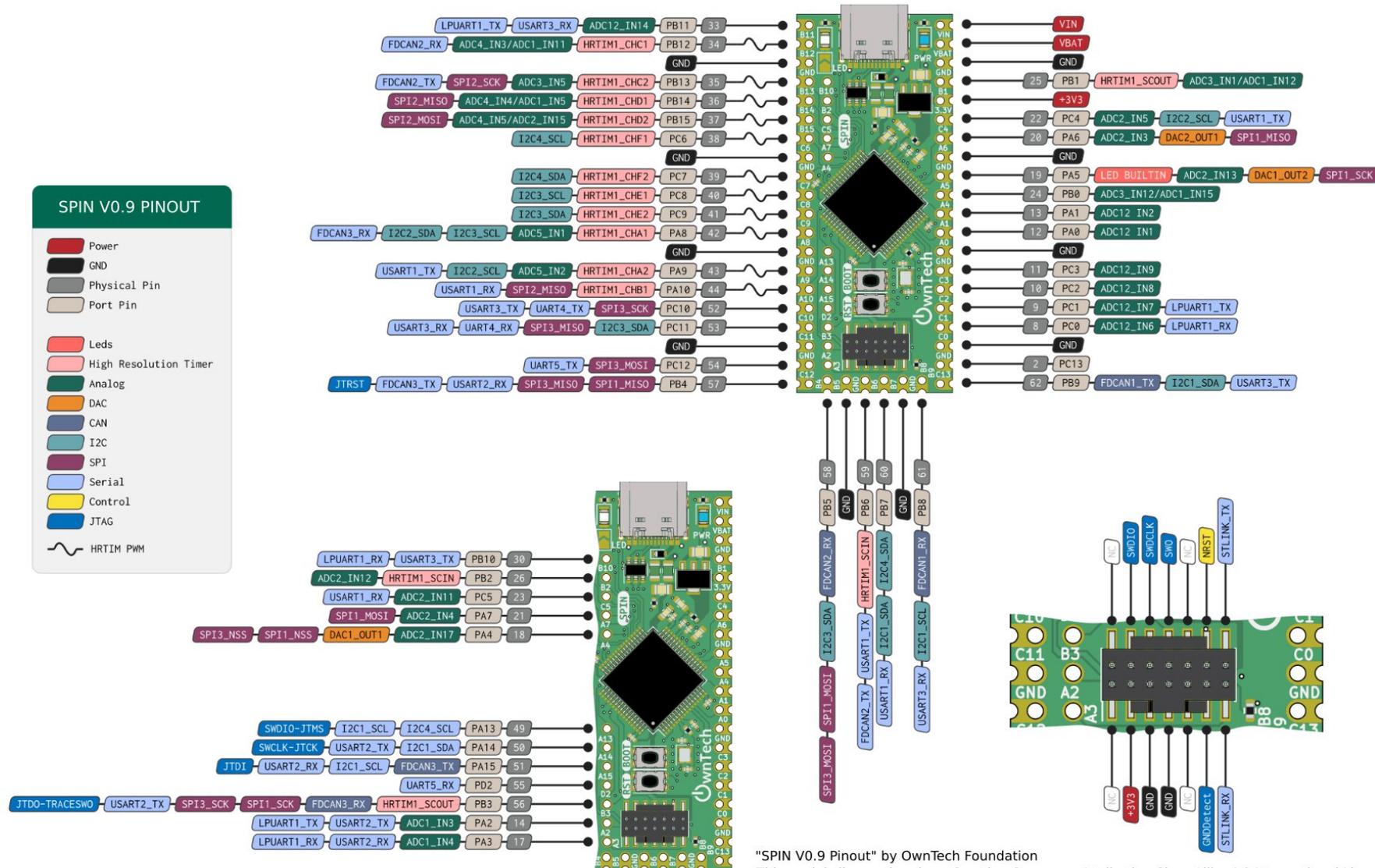
Control engineers, after setting up their test benches with TWIST, can seamlessly transfer their algorithms to their custom power hardware.

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# Our stack

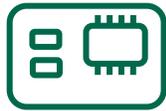


# The SPIN Board: Versatile control



# OwnTech is open-source

## Open Tool



### TWIST et SPIN

CERN-OHL-S-V2

All changes have to be shared with the community

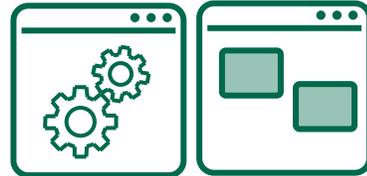


### Documentation

CreativeCommons SA-BY

Share Alike – The documentation must keep its current licence

Can be sold, modified but must remain open source



### OwnDev + OwnPlot

GPL V2

Can be interfaced with open-source and proprietary libraries



### Dataware

Apache 2

Can be interfaced with open-source and proprietary libraries

## Solution



### Solutions

Licence of your choice

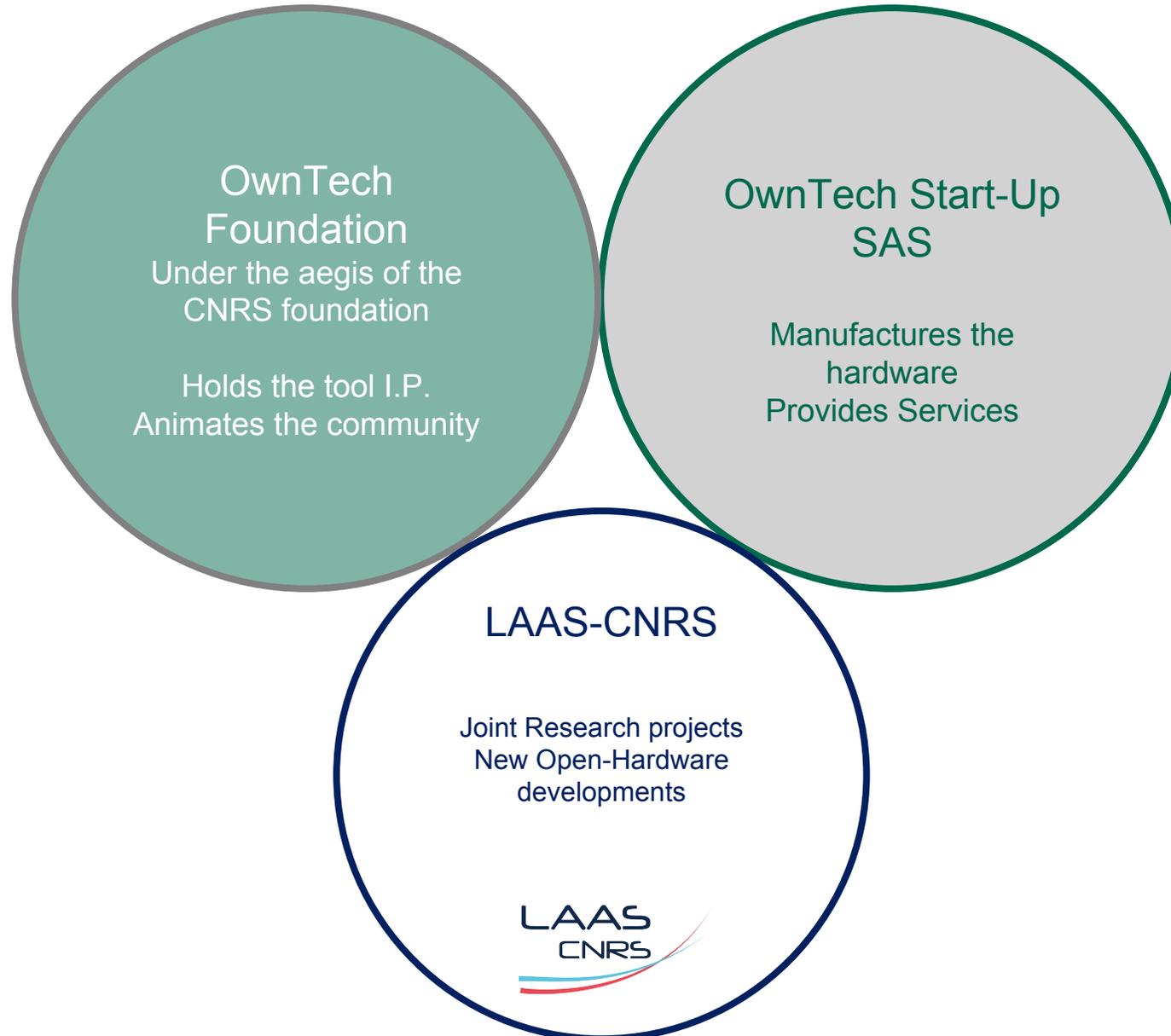
Open-source or proprietary

## ★ Open-o-meter - 8/8

- ✓ The design files are available
- ✓ Assembly instructions are available
- ✓ Component list is available
- ✓ Contribution guide is available
- ✓ CAD files available in editable format
- ✓ Assembly instructions available in editable format
- ✓ Component list available in editable format
- ✓ All information is available for commercial use

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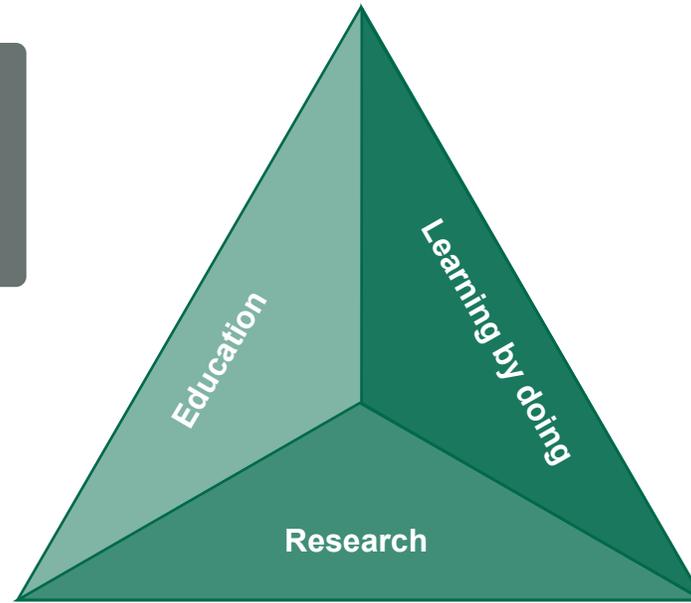
# A hybrid and validated legal structure



# OUR ACTION

Create MOOC and tutorials for technological educational in energy and power electronics

Coordinate a global digital community to foster international collaboration



Organize training sessions and events to answer local energy uses cases



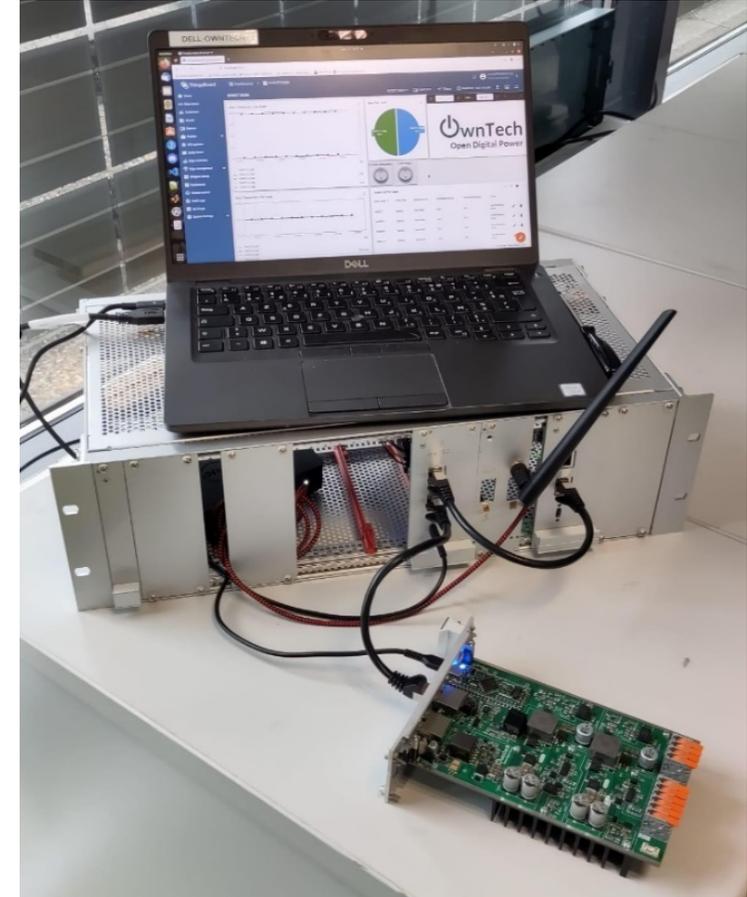
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# Open-Source Micro-grid Study Case

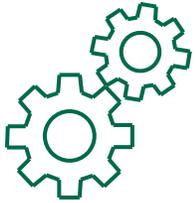


Local energy production and consumption is a key to peer-to-peer energy systems. We will demonstrate how OwnTech can be used to illustrate these energy exchanges.

**OwnTech proposes to open-source the power electronics dedicated to the neighborhood-level energy exchange and micro-grid design.**

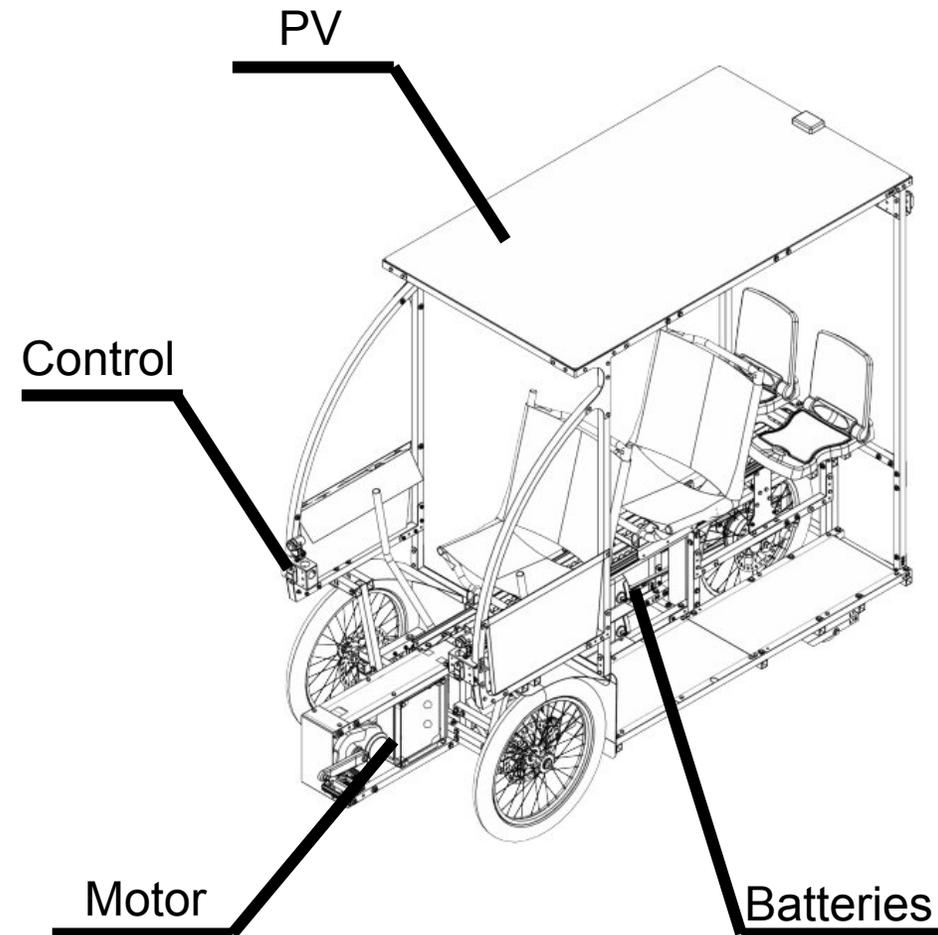


# Open-Source Drive Train and charger



The Vhelo uses an assembly of proprietary components to build its drive train and battery.

OwnTech is working to open-source the power electronics dedicated to the drive train, BMS and battery charger to facilitate its maintenance, flexibility and long-term perennity



Get involved :  
Share  
Support  
Volunteer

[www.owntech.org](http://www.owntech.org)

[contact@owntech.org](mailto:contact@owntech.org)

 **OwnTech**  
Foundation

 **la fondation**

