LIÈGE université
Sciences Appliquées

# CleanGrid Project

## Towards less electrical pollution on the grid

Cédric Verstraeten
Bastien Ewbank

# Outline

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    i. Goal of the project
    ii. Impact of power converter on the grid
    iii. Innovations
2. A powerful tool : Hardware-in-the-loop (**HIL**)
    i. What is HIL ?
    ii. Use of HIL in Cleangrid
    iii. Summary
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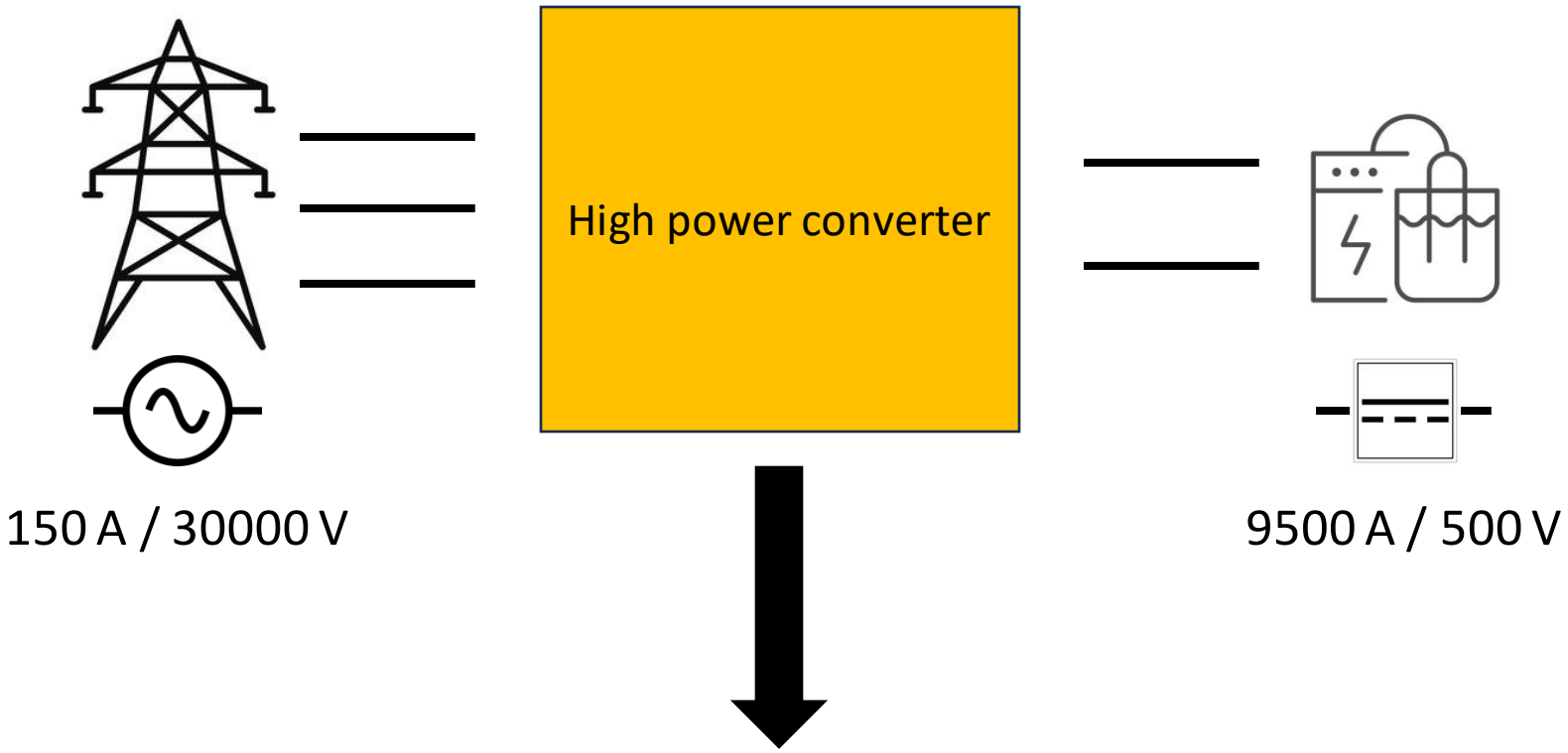
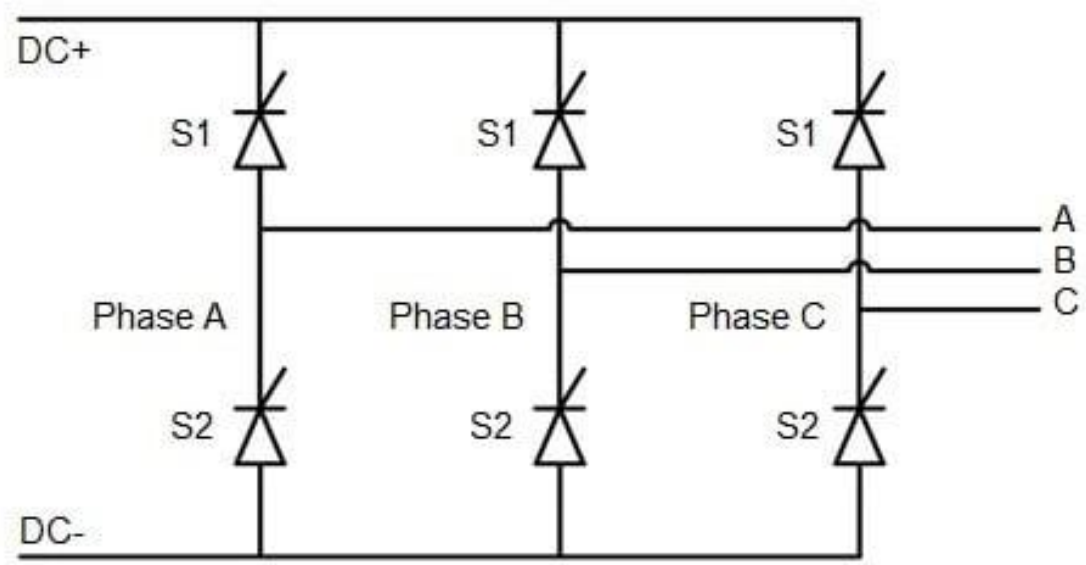
# The Cleangrid project

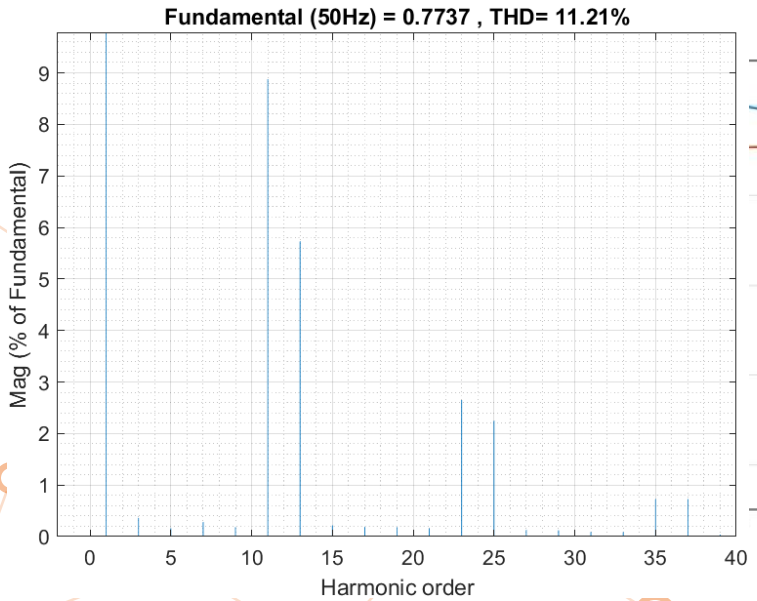
# Goal of the project

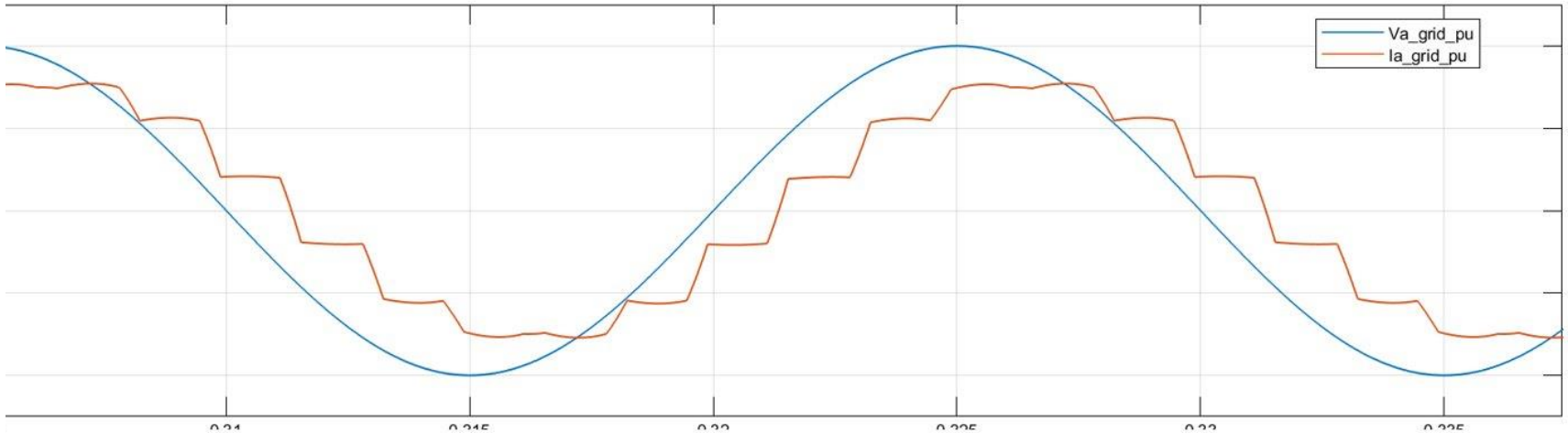


# Impact of power converter on the grid

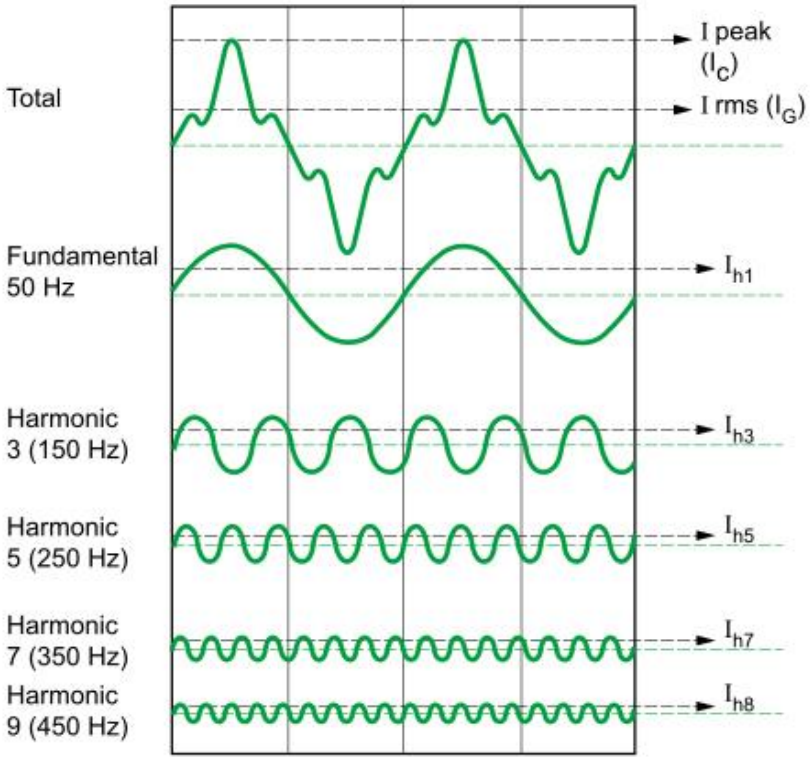



Thyristors → Non-linear loads



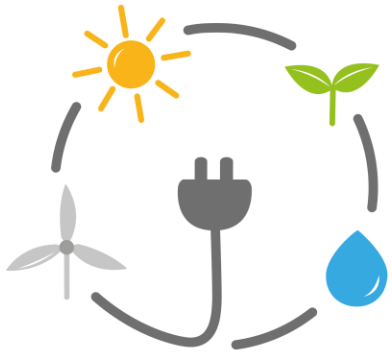
# Impact of power converter on the grid




Harmonics = Grid pollution

- Increase losses
- Reduce life expectancy of electrical devices

# Impact of power converter on the grid



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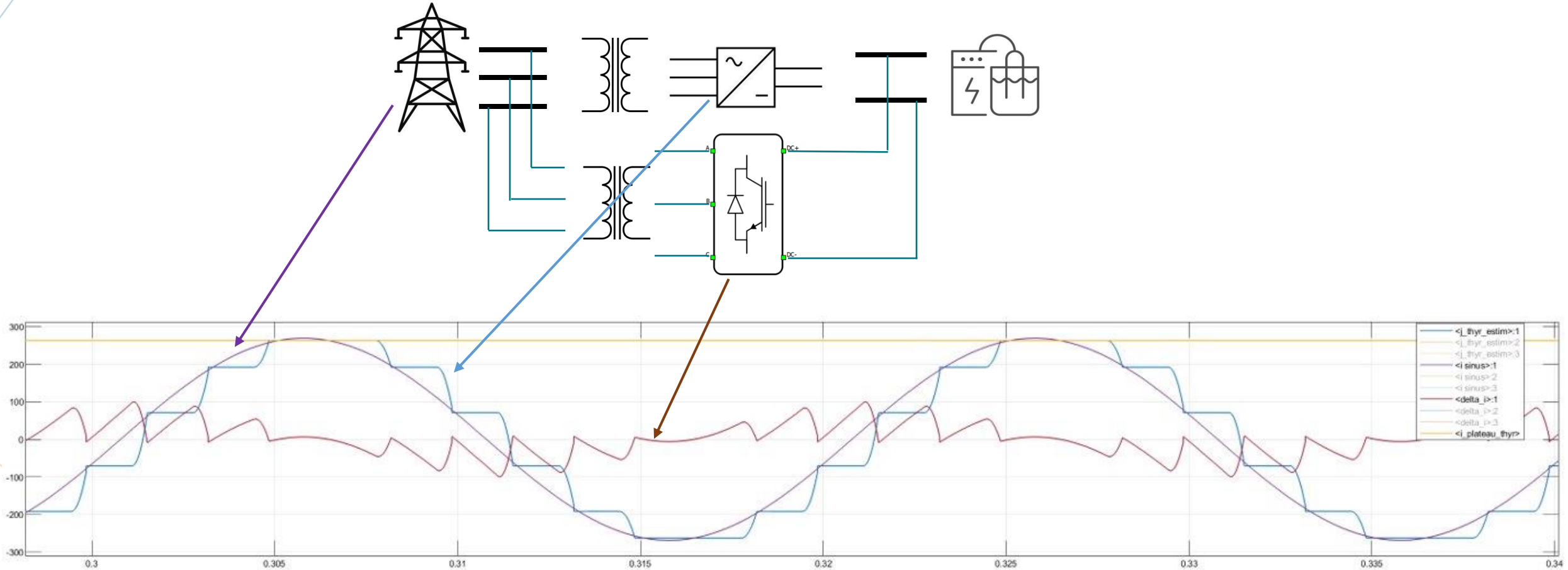
Power converter
(inverter, rectifier,…)

↓

Mitigate harmonics
(policies exist)

# Innovations



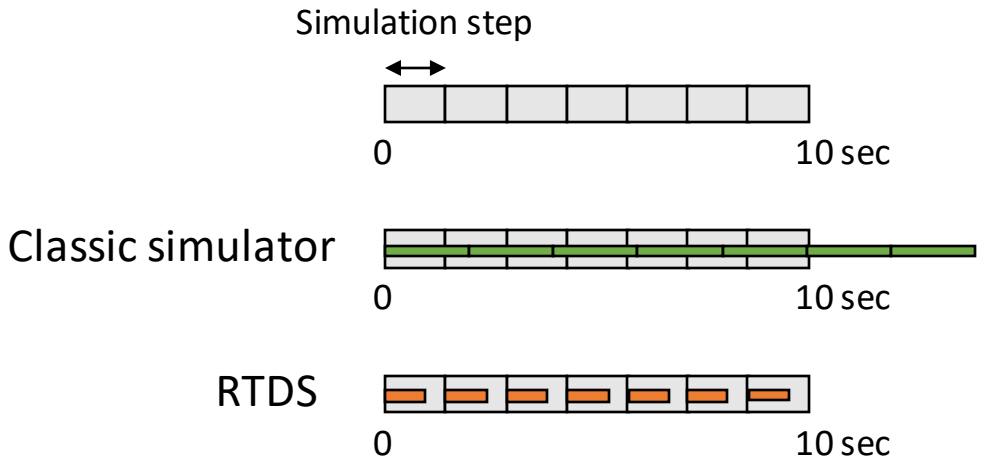
# A powerful tool :

# Hardware-in-the-loop (**HIL**)

# What is HIL ?

## Real-Time Digital Simulator (RTDS)

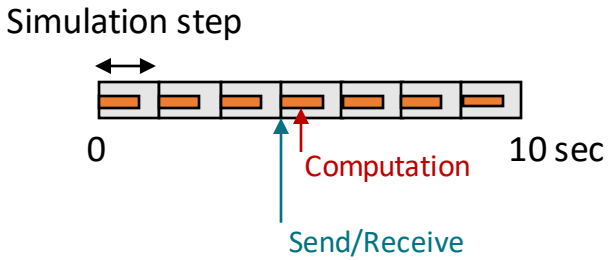
Dedicated device containing FPGA chip to compute differential equations super fast

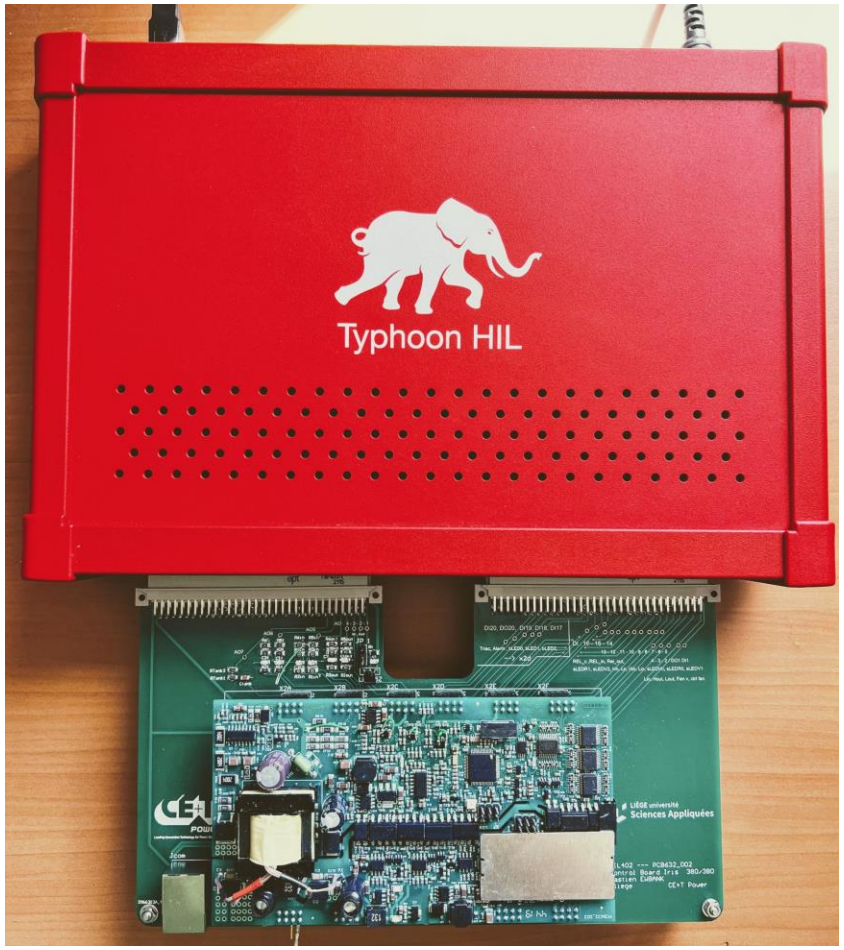



# What is HIL ?

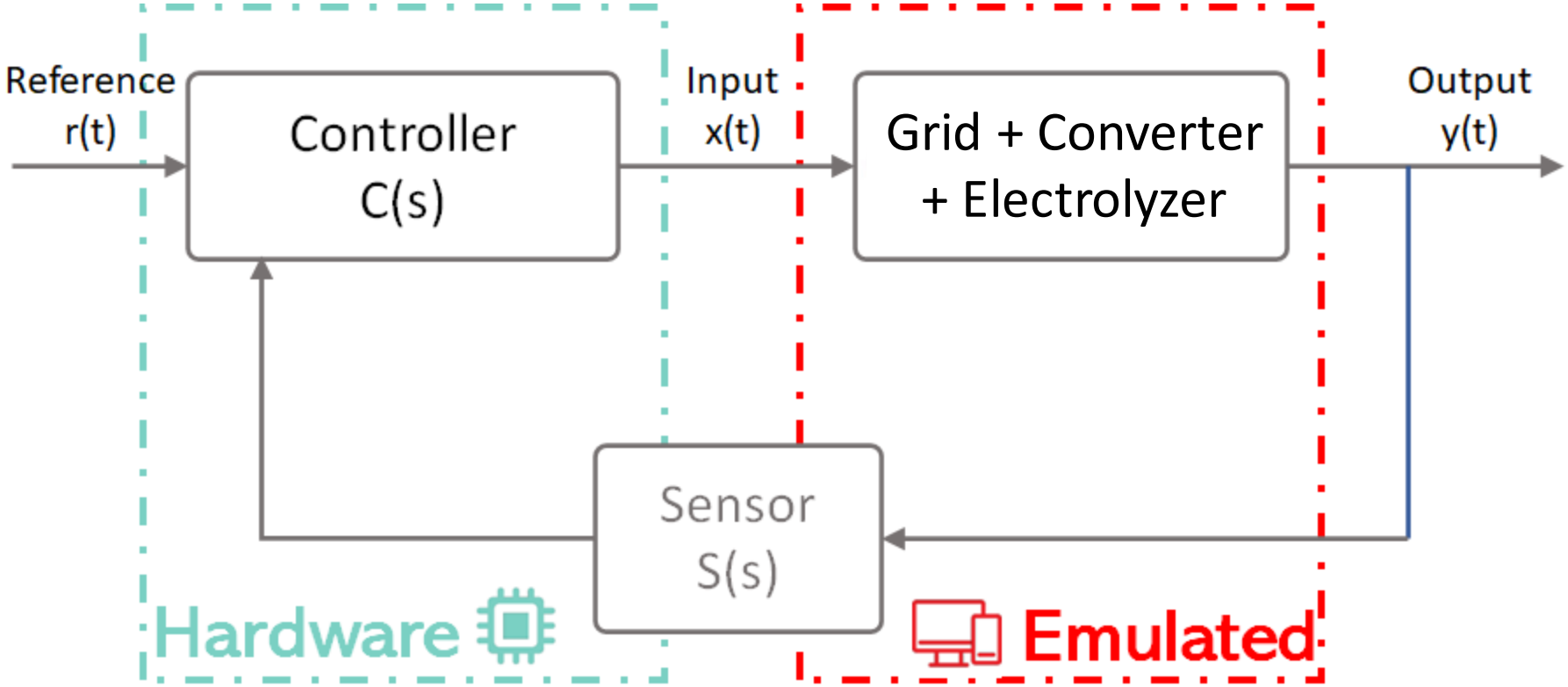
Real-time → Can communicate with other devices

"Hardware-in-the-loop"



# Use of HIL in Cleangrid



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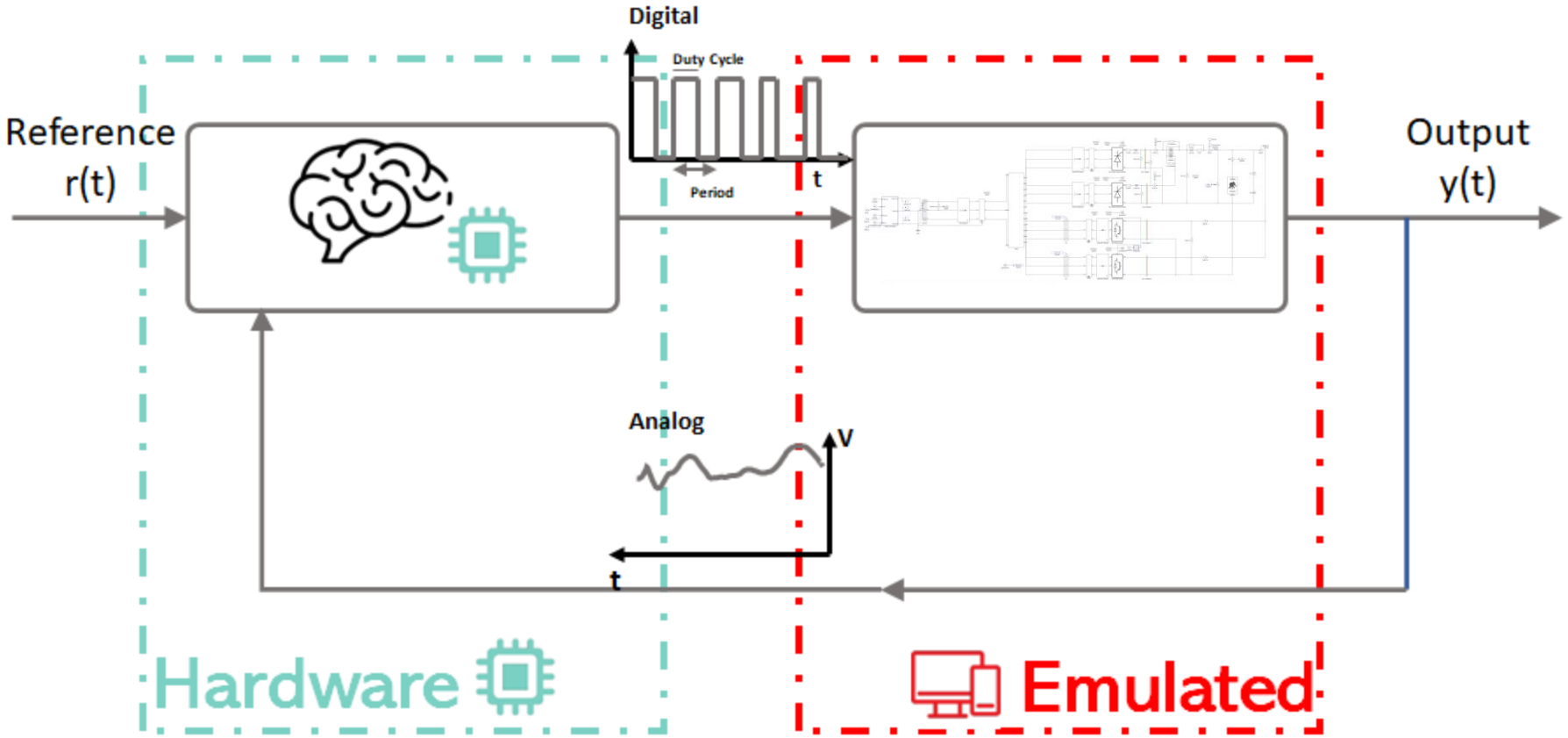
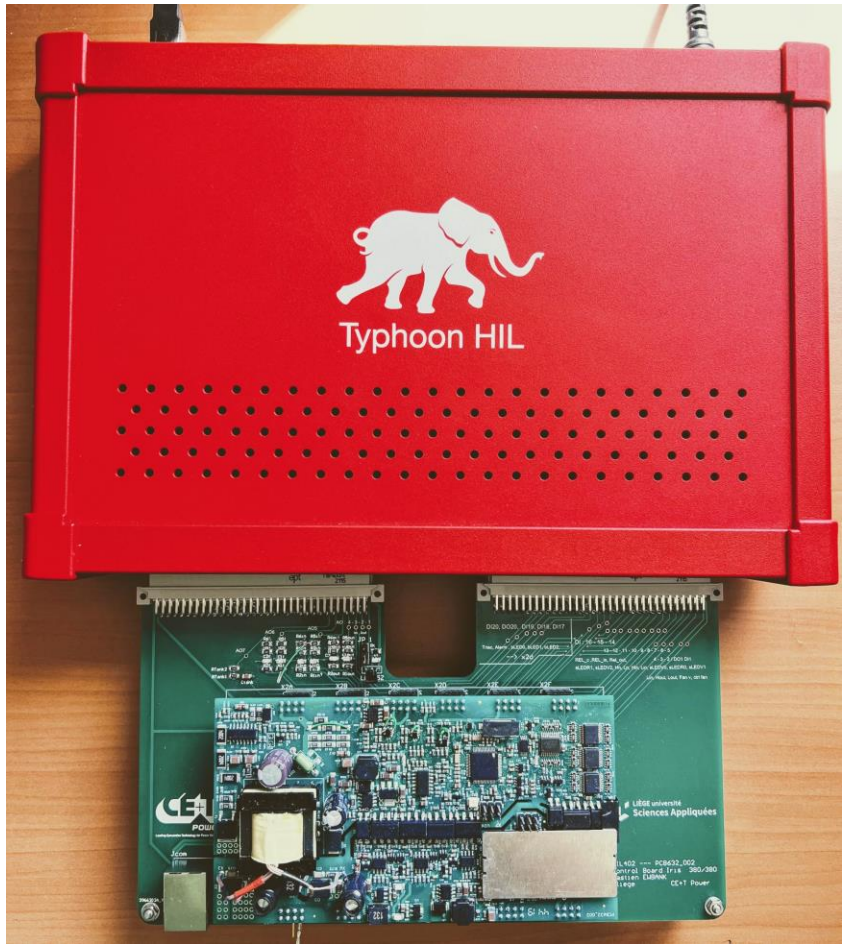


# Summary

Real-time simulation tool that combine :

Experiment's **accuracy** + Simulation's **flexibility**

“Digital twins”



# Demo

https://youtu.be/A2EE6GHKBIA