

EdgeTunePower

Sam Maleki, Ph.D., P.Eng.

WWW.EDGETUNEPOWER.COM

De-Risk Commissioning using HIL



- Two Controllers Only
- Grid Connected
- Uptime Requirements (the more the better)
- **All sort of commissioning and operation issues**
- **Curtailment or shutdown**
- **We trusted a lot on simulations (there is ALWAYS some mismatch)**

Why it is a must for Data Centers

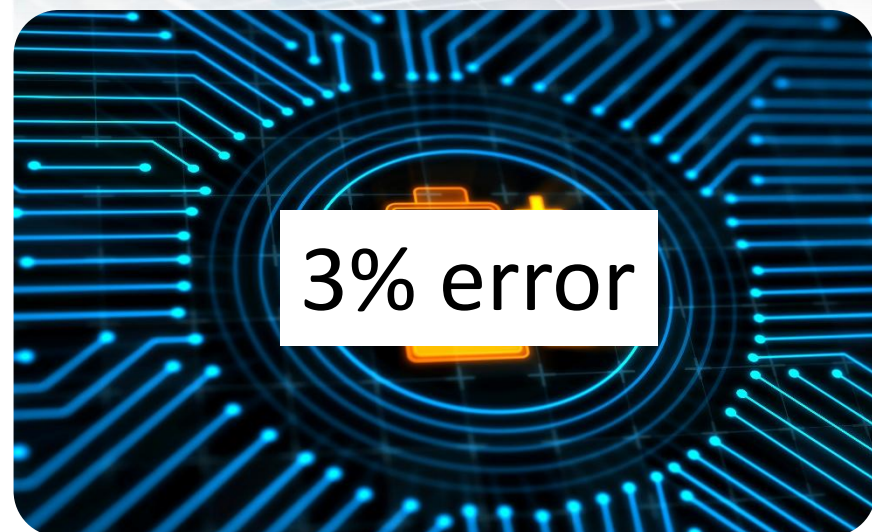


Complex energy mix
Uptime 99.9999%



AI load
(nightmare for Electrical system)
Grid connected and islanded

Simulation errors will add up!



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Simple Math

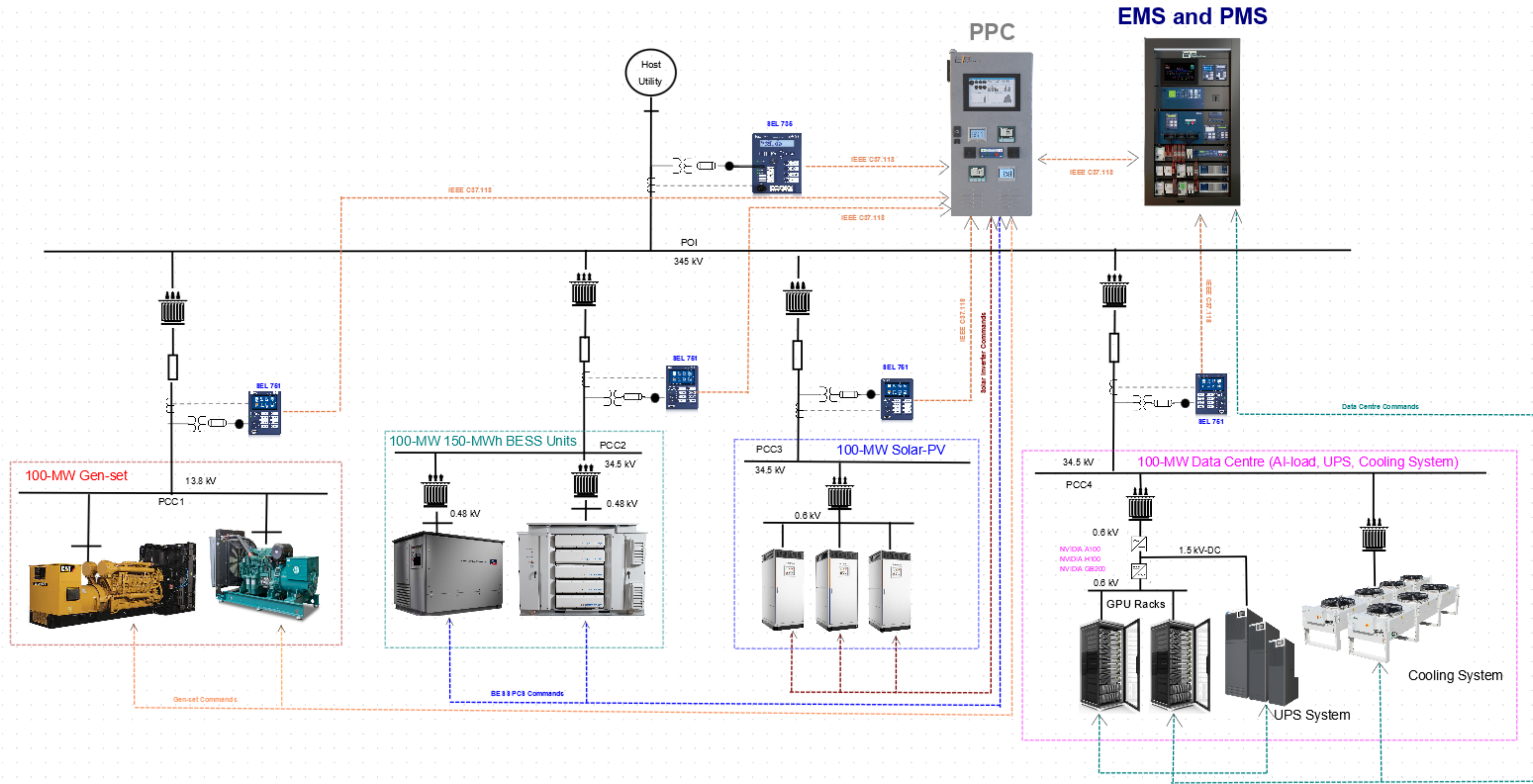
3%+3%+3%+2%+10%= million-dollars of losses every day

When to consider this?

Very early stages

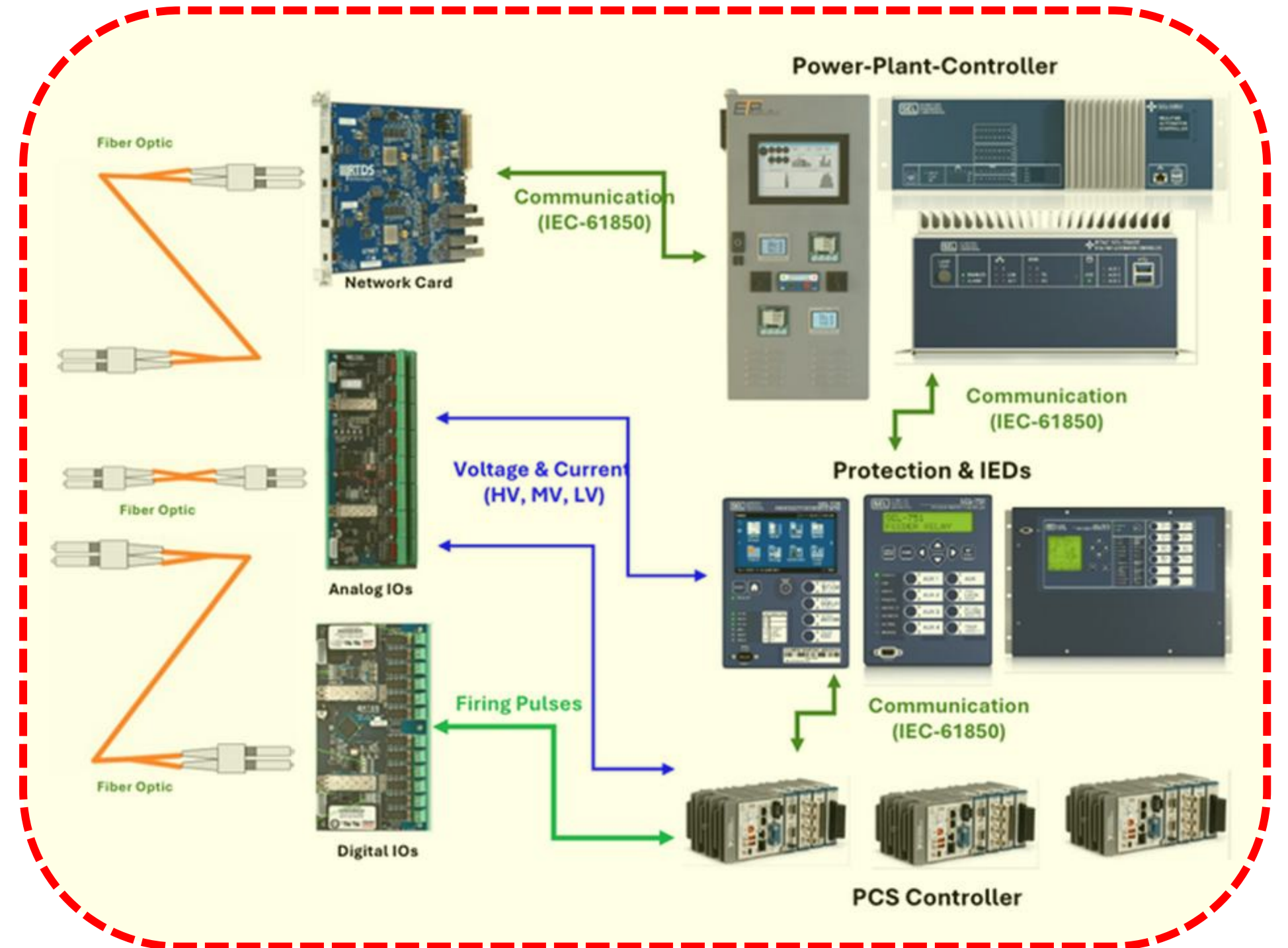
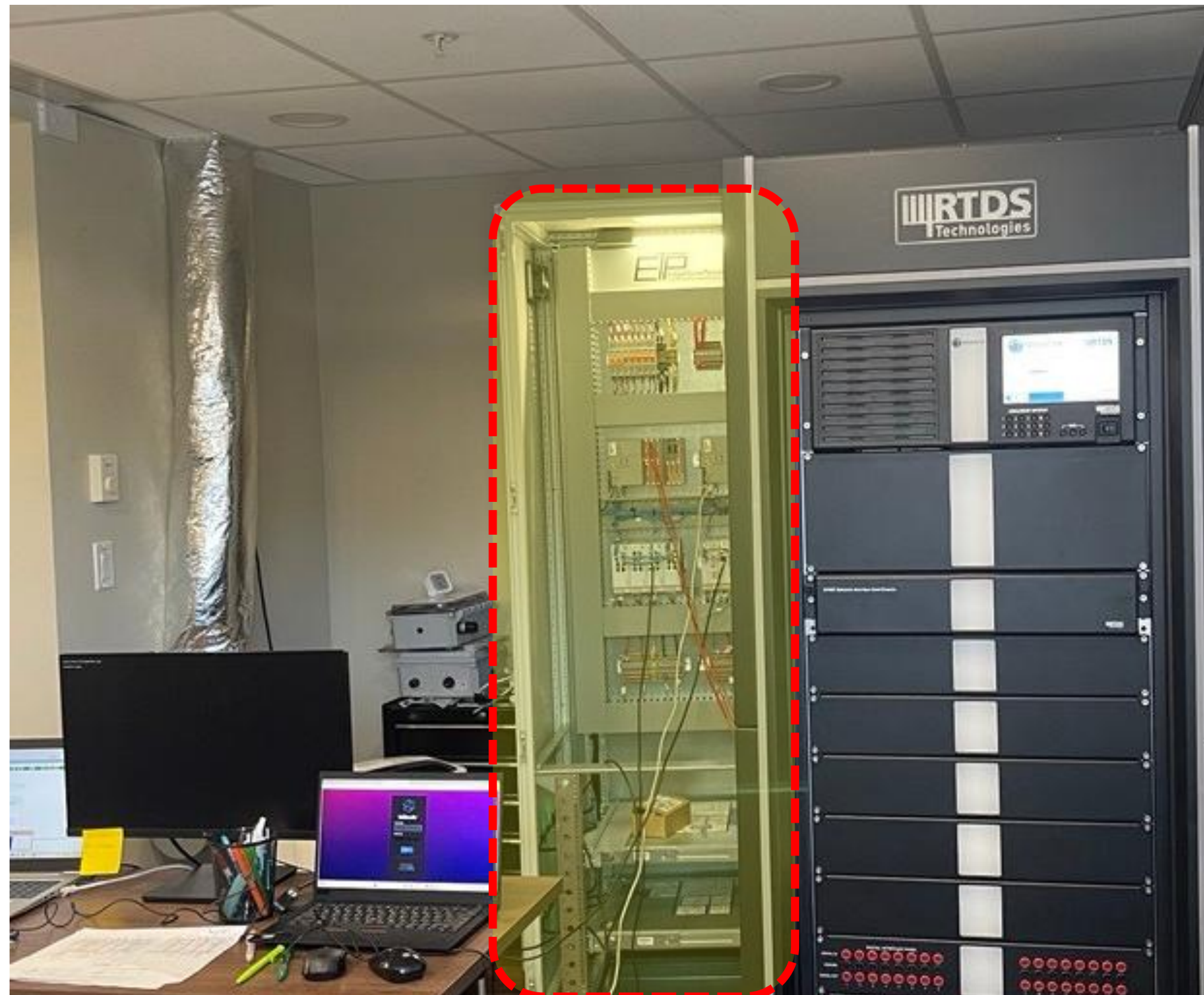
- **OEM selection**
- **Sizing the units (BESS, Generaor, Solar, Wind, etc.)**
- **Why?**
 - **Lets see how a 20 msec delay can drastically change all the results?**

Data Center Test-bed and AI load Simulator



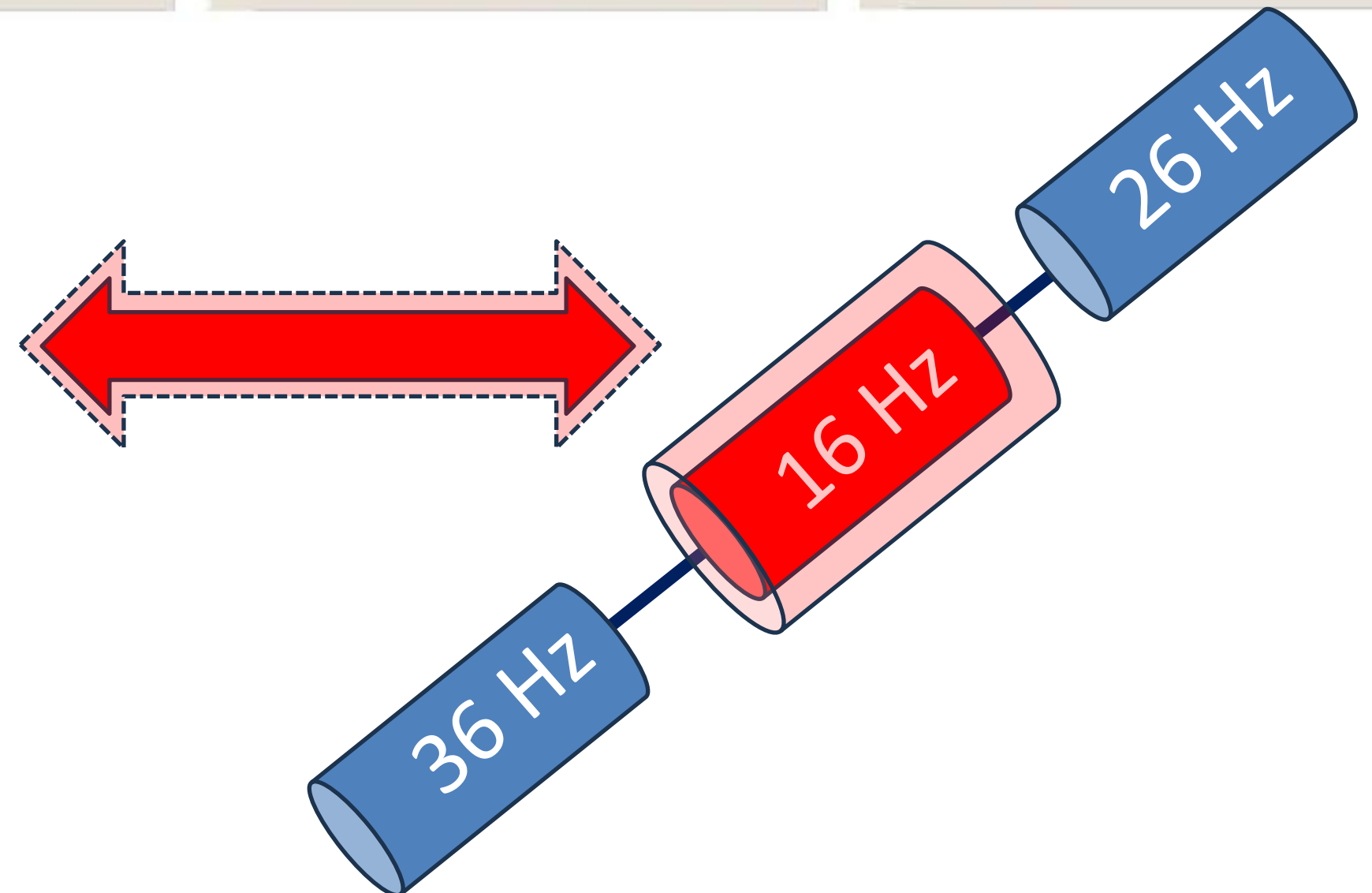
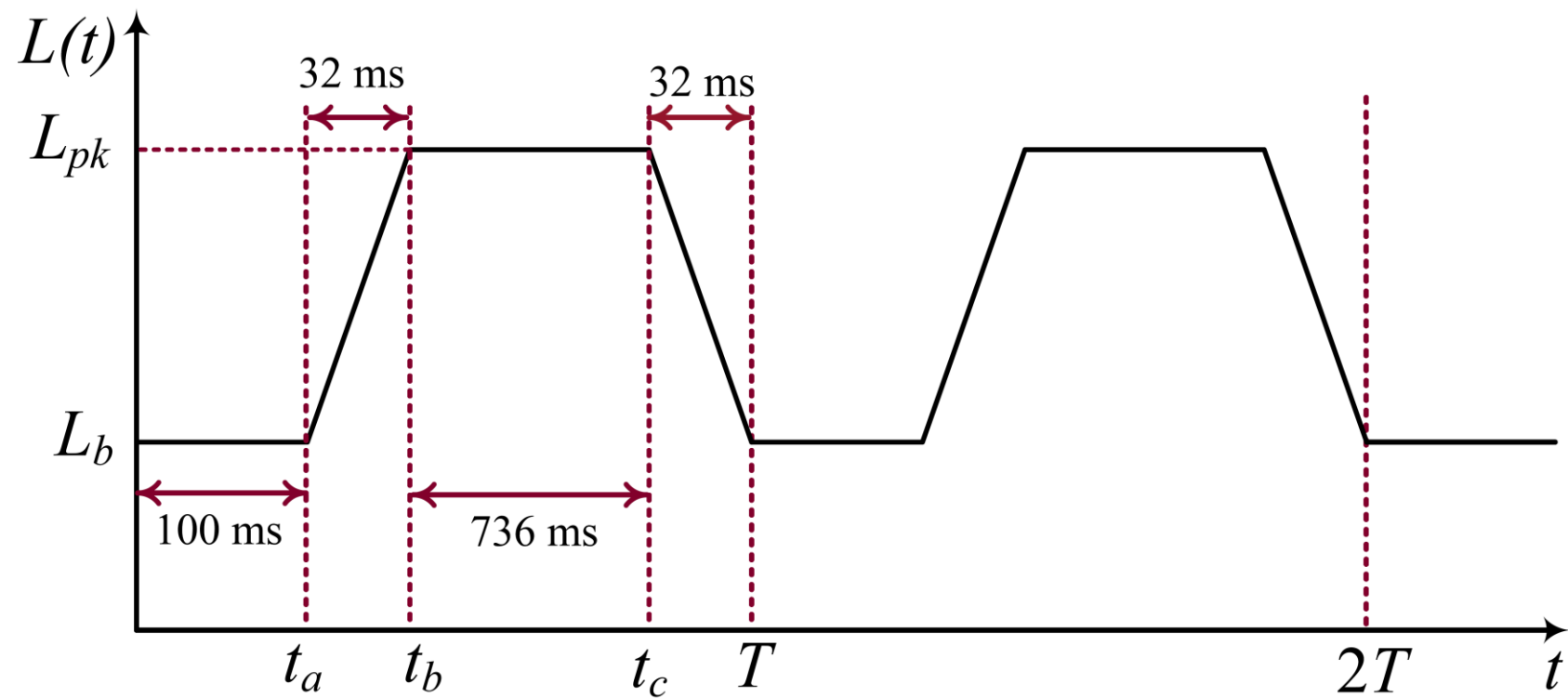
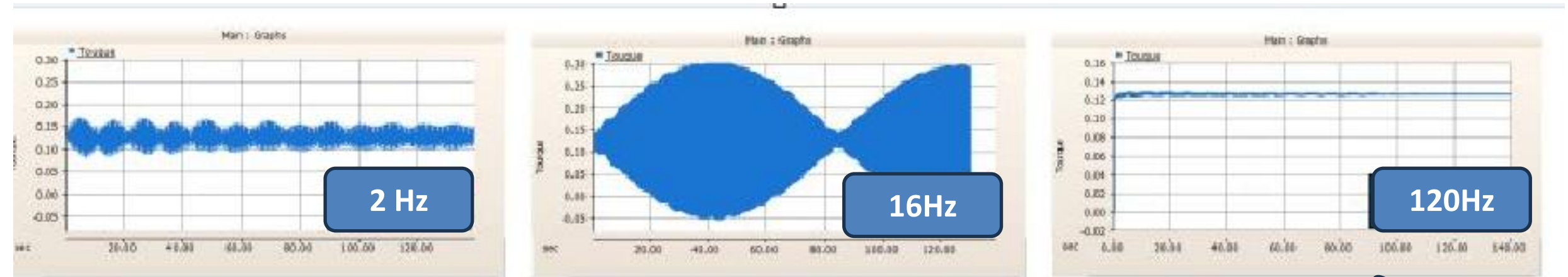
Digital Twin

De-Risk Commissioning and HIL Testing

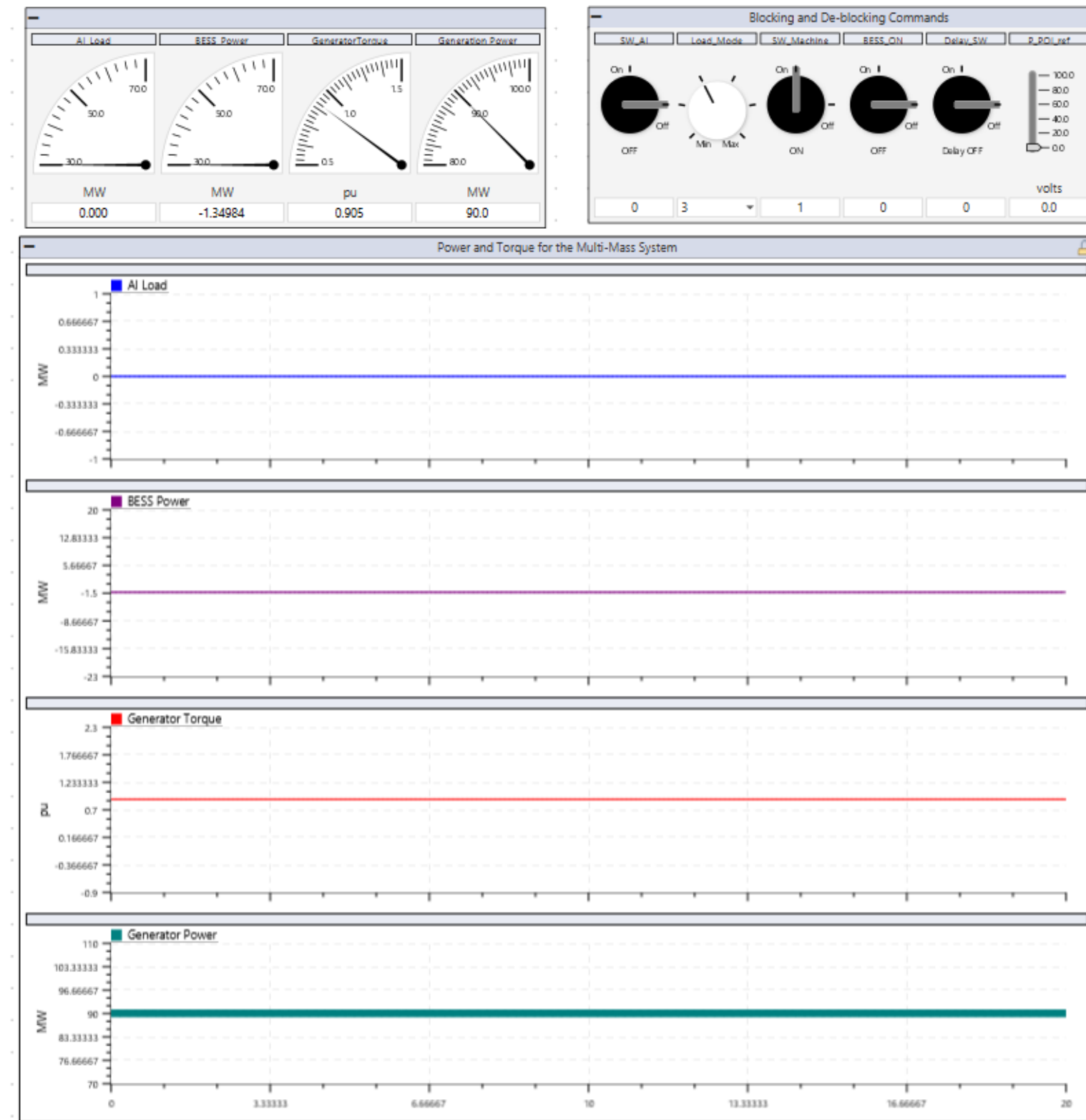
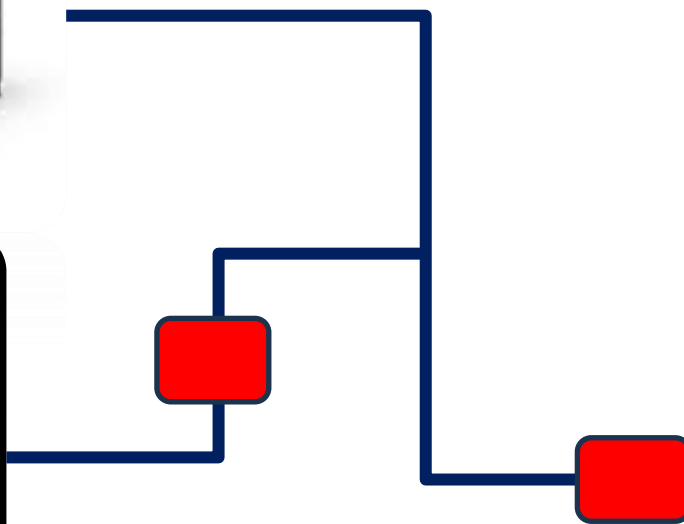
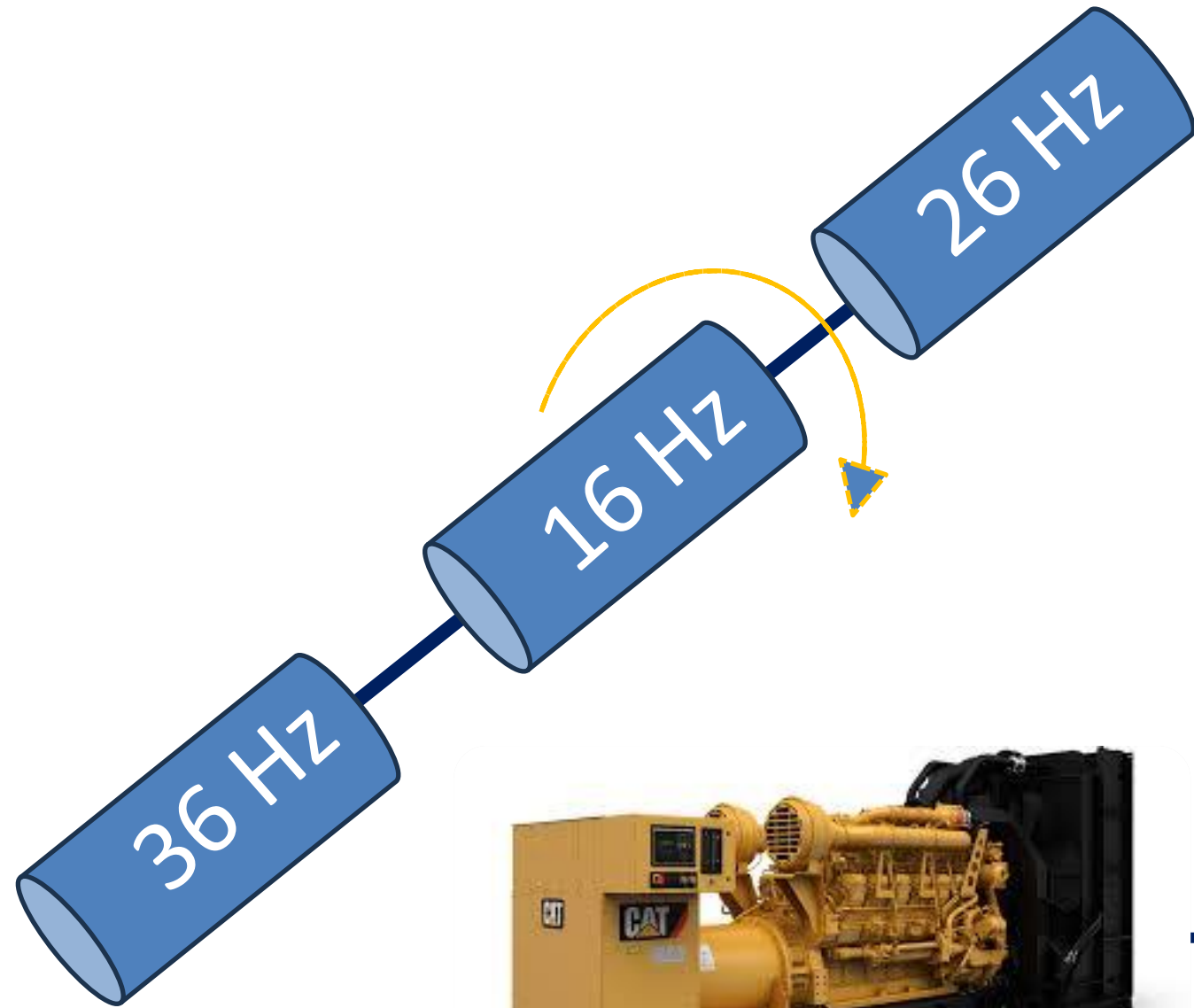


Generator Shaft Oscillation

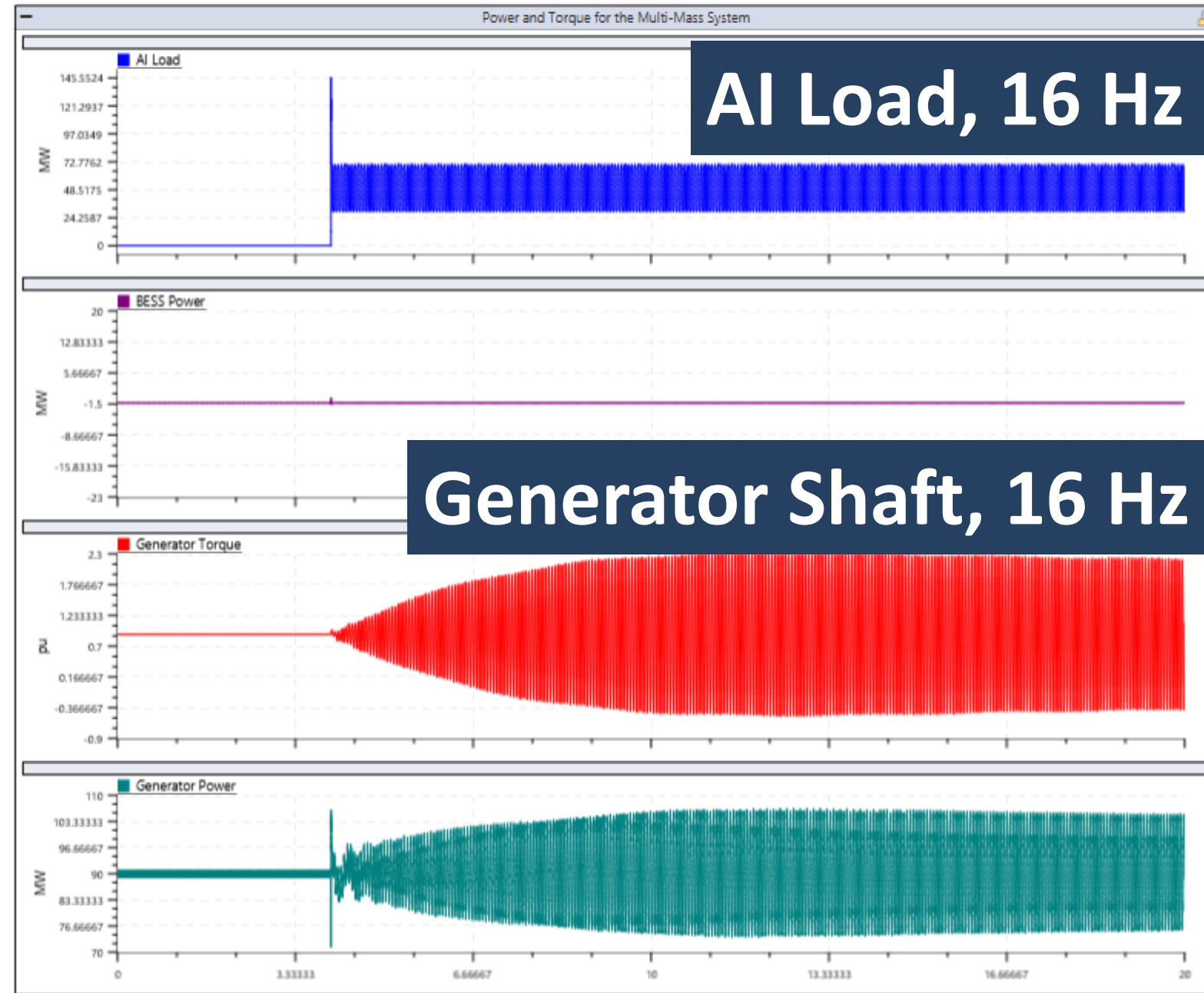
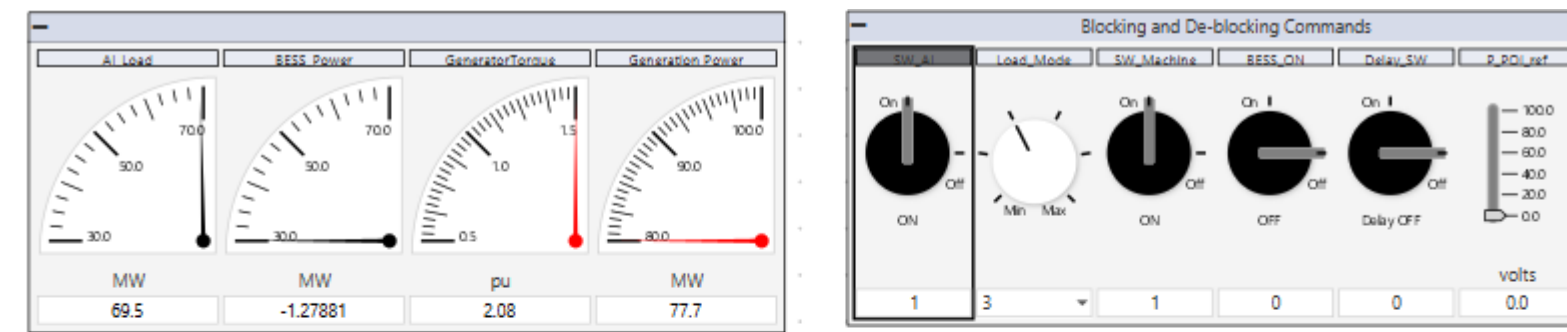
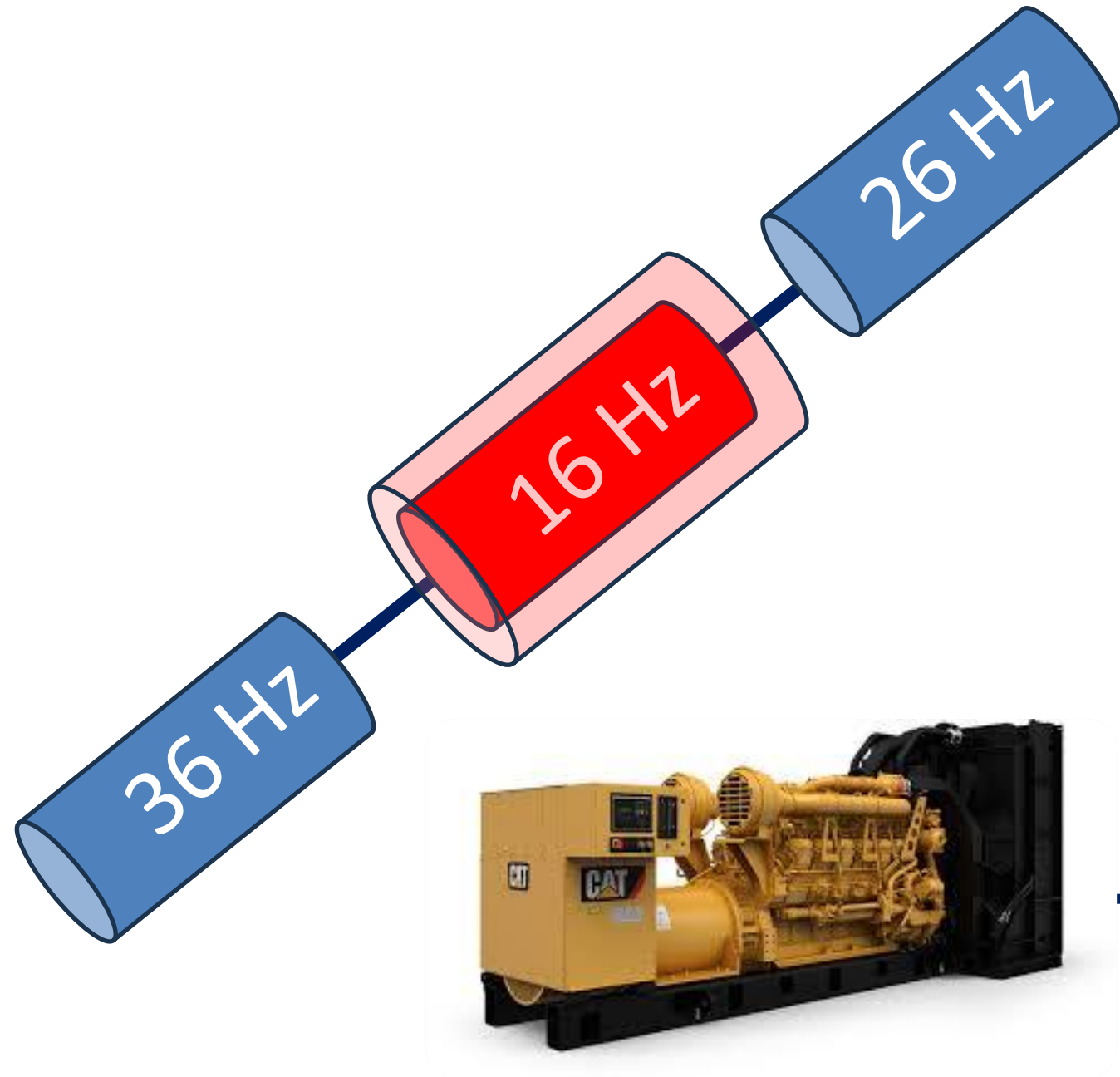
AI Load



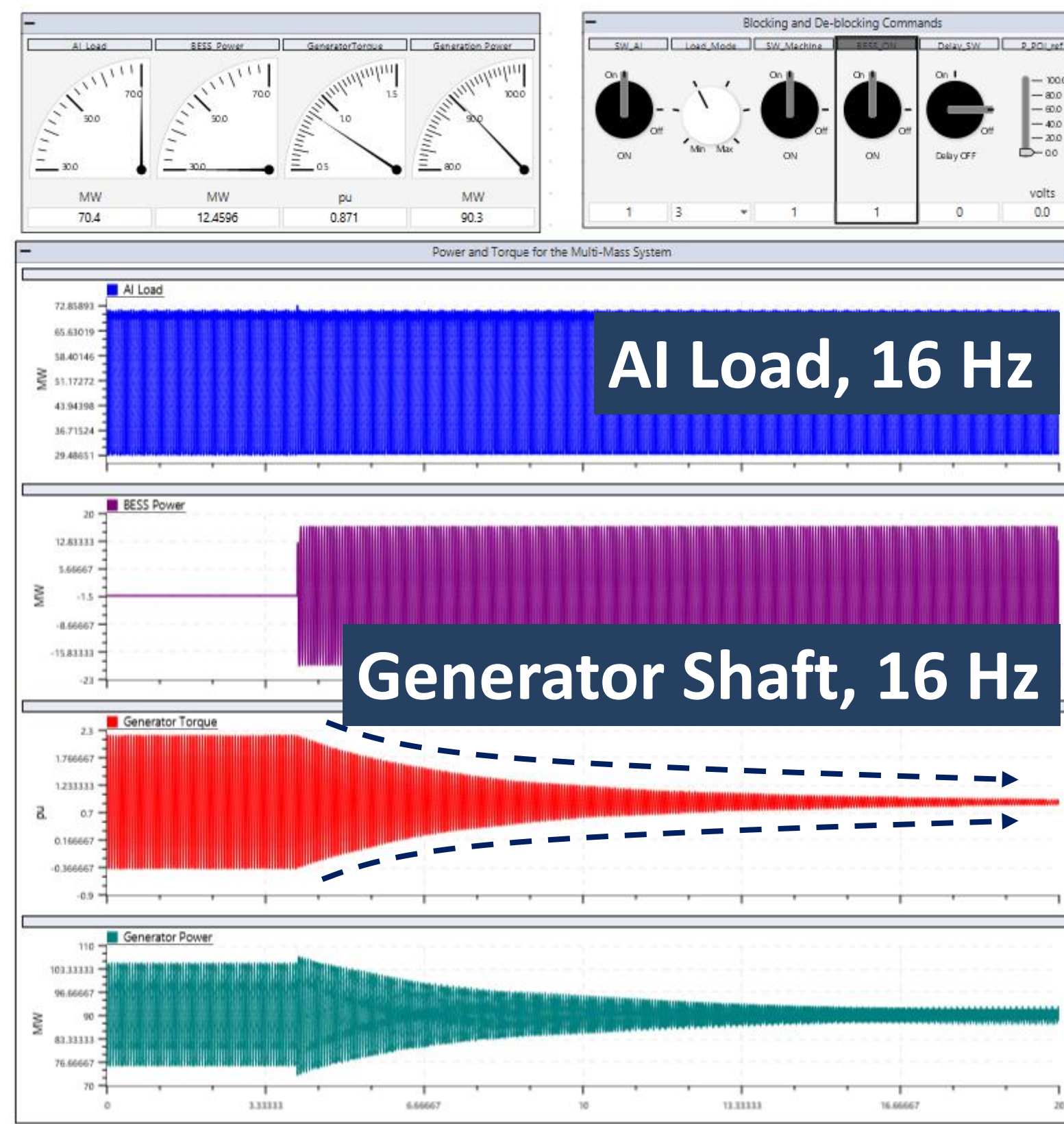
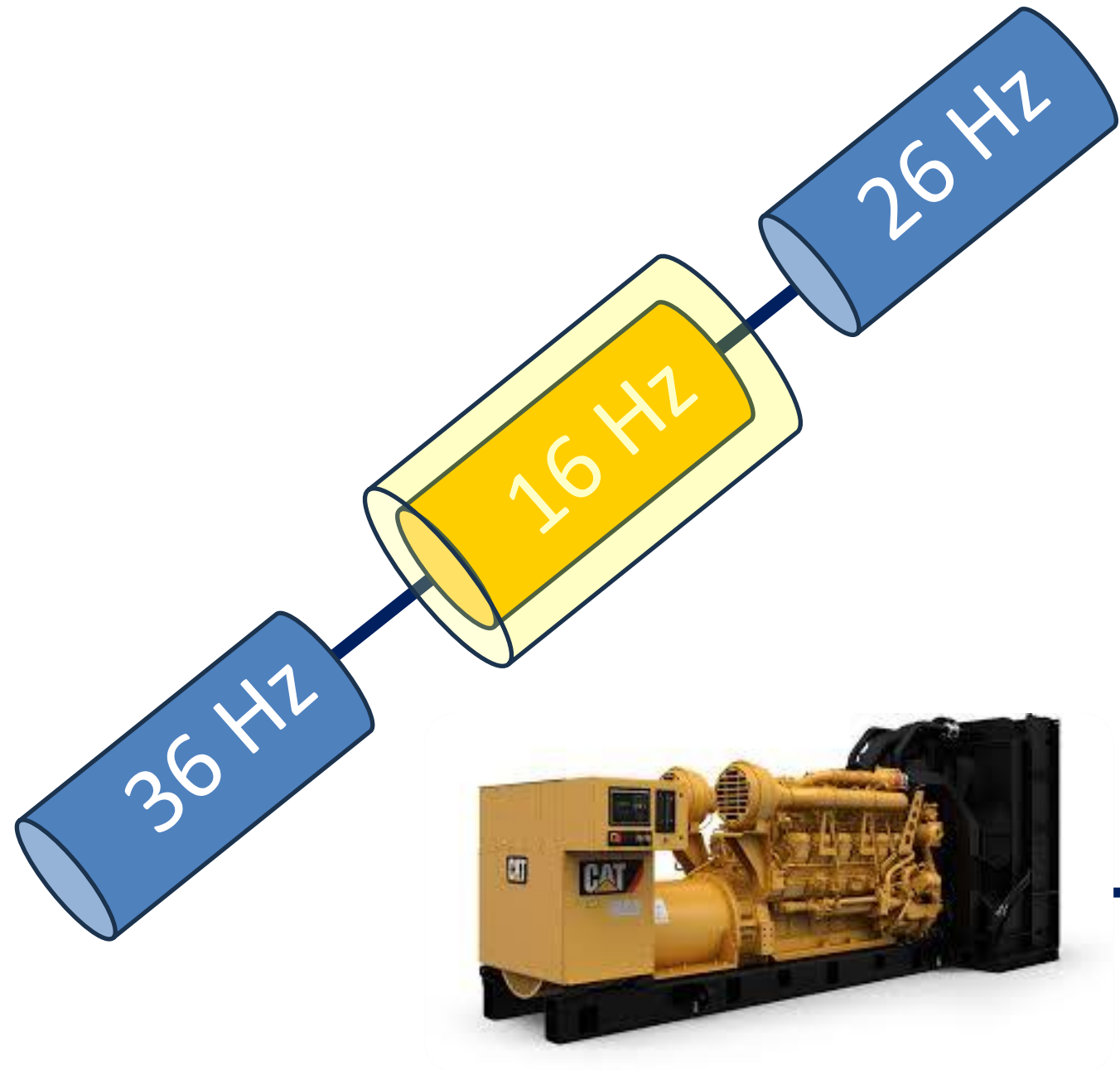
No AI training



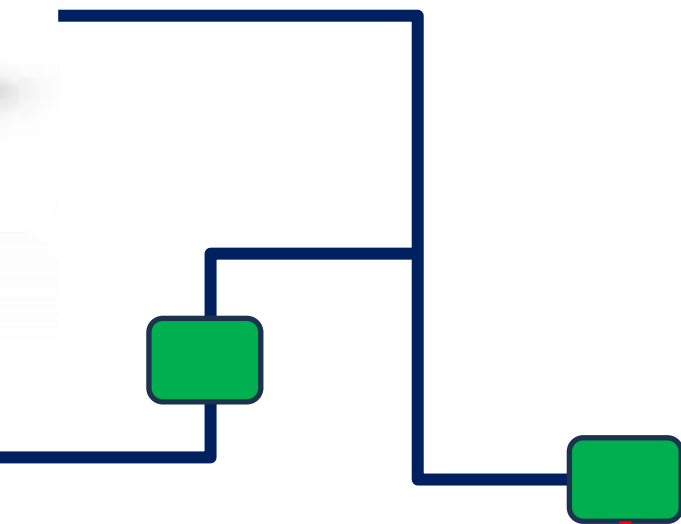
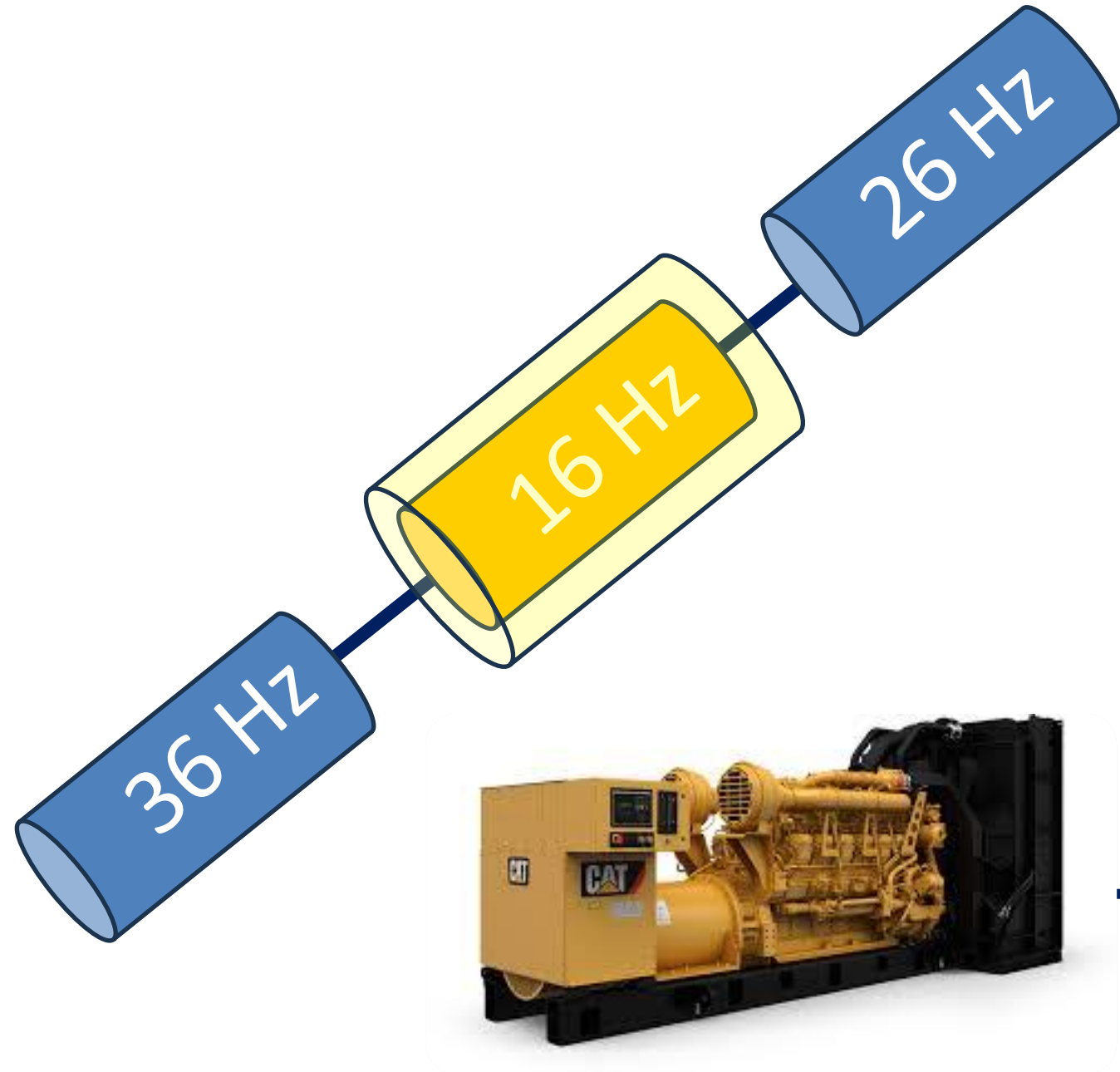
AI Load 16 Hz



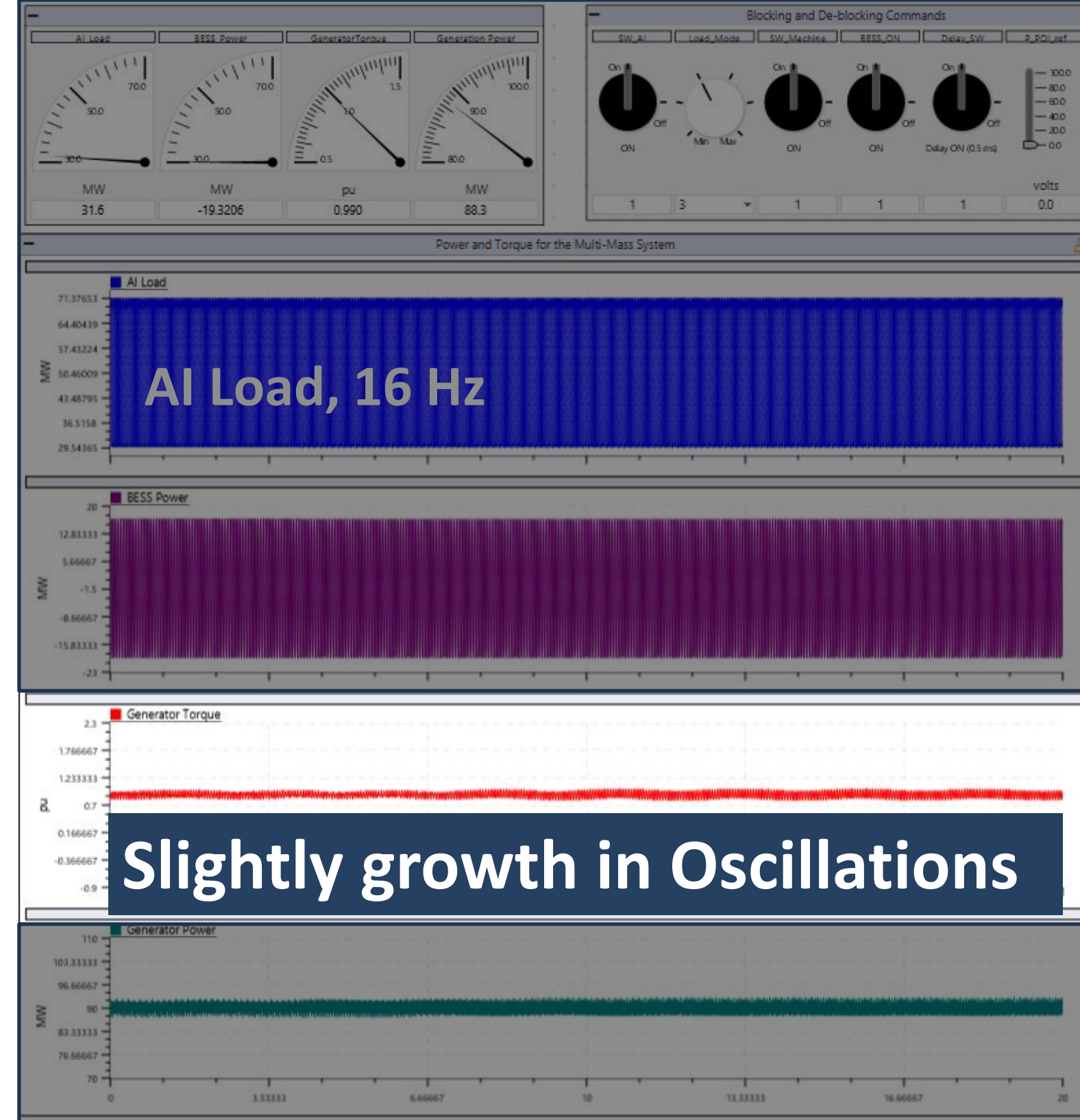
Inline BESS activation



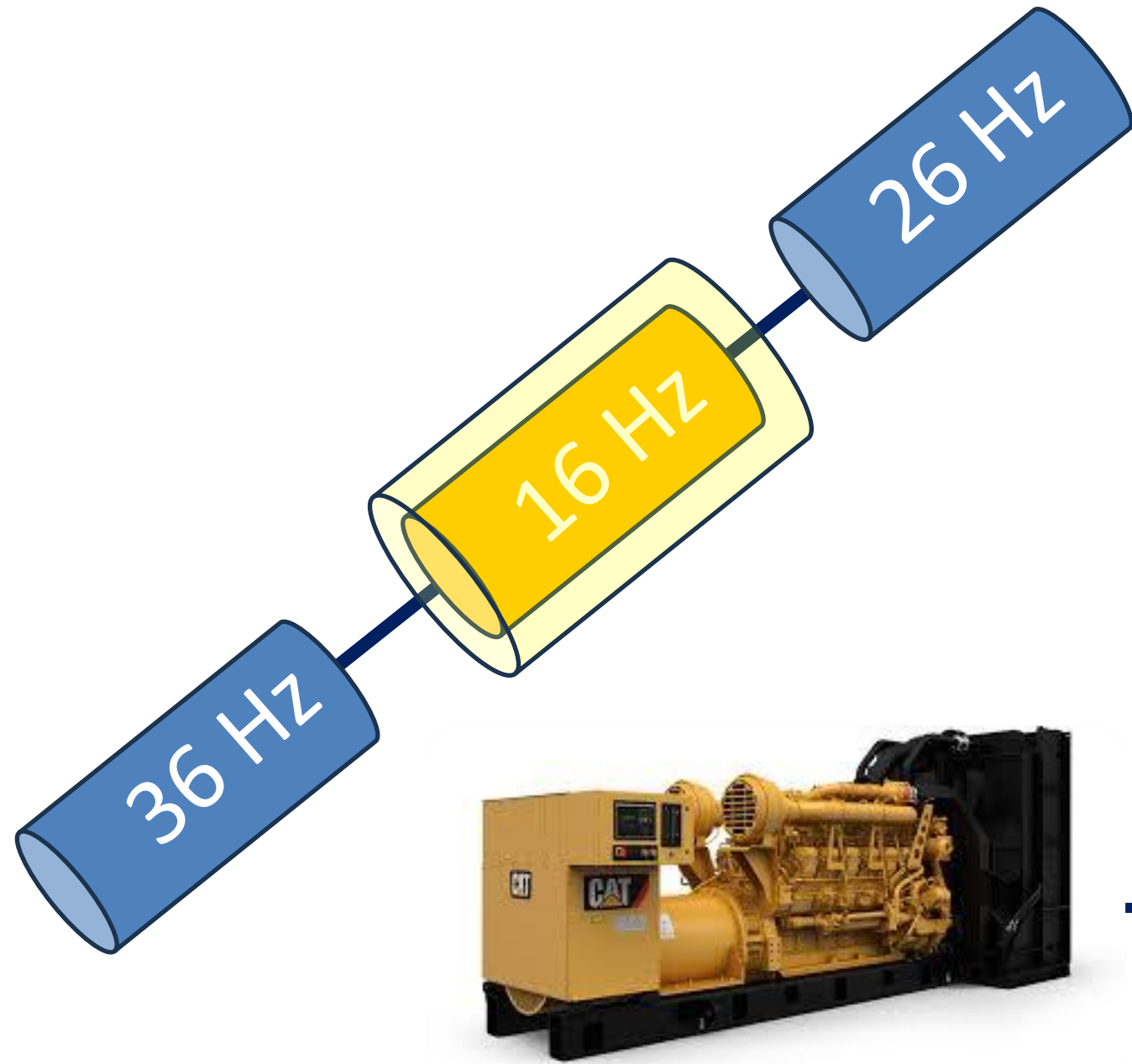
0.5 ms communication delay



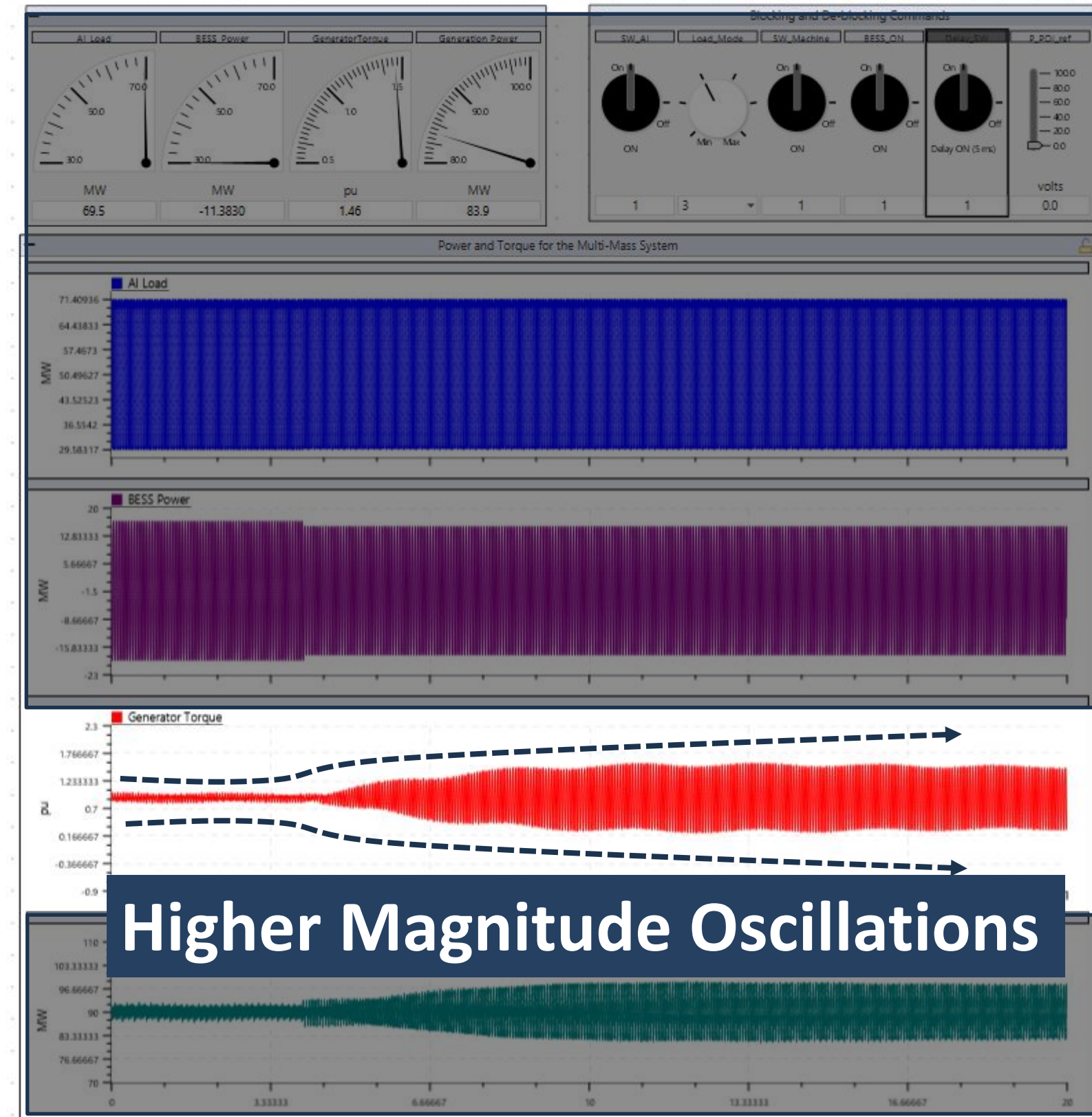
Communication!



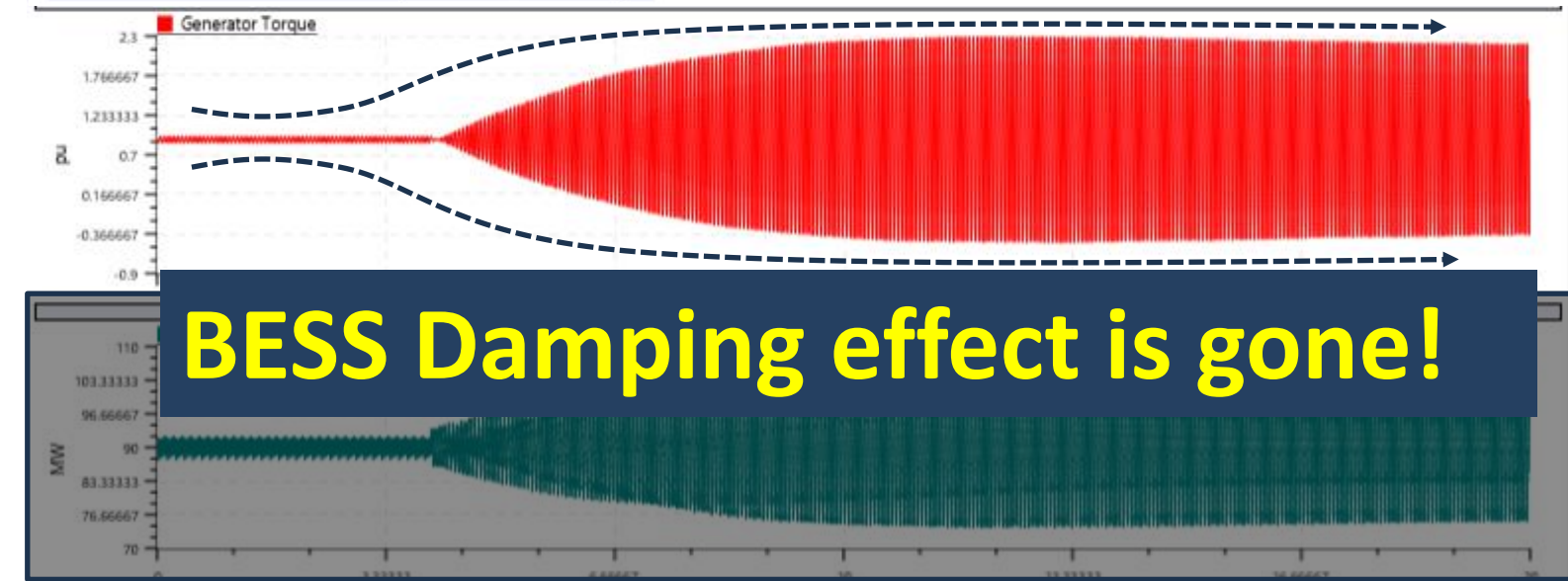
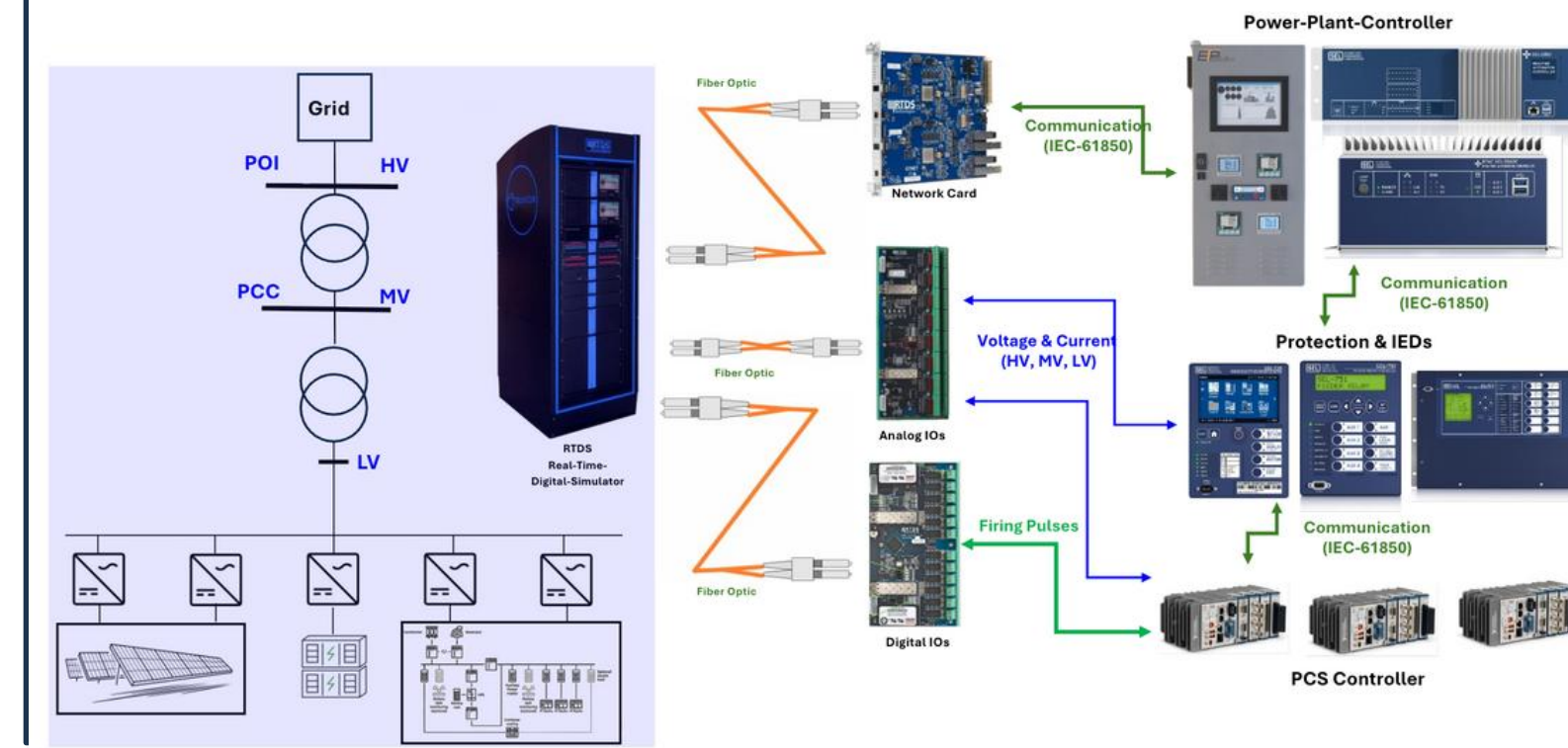
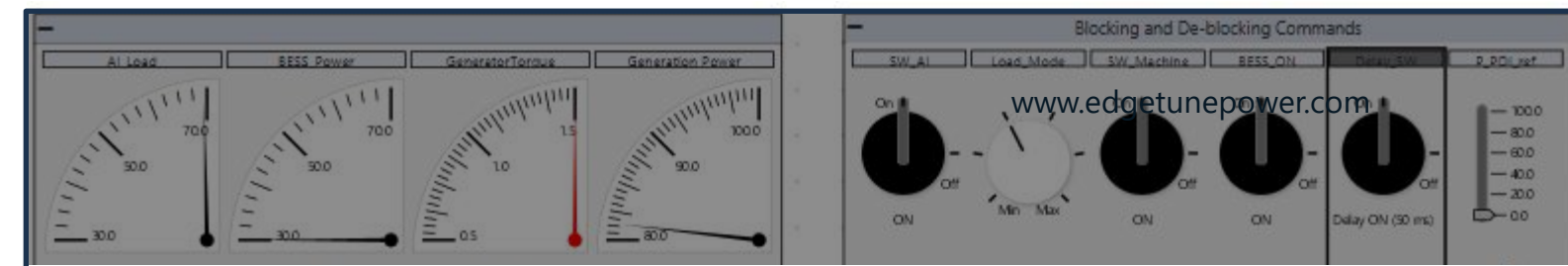
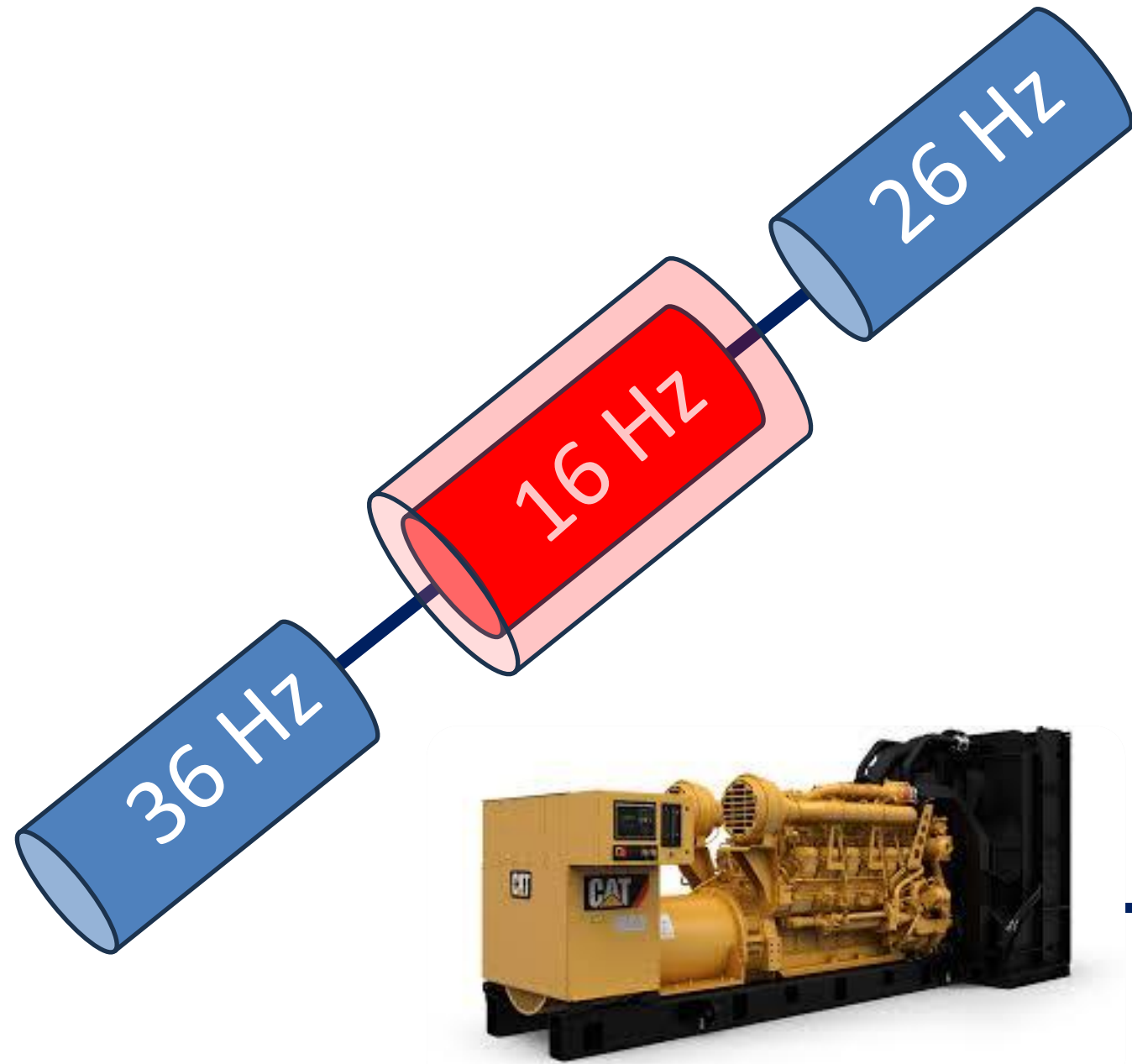
5 ms communication delay



Communication



20 ms communication delay



BESS Damping effect is gone!



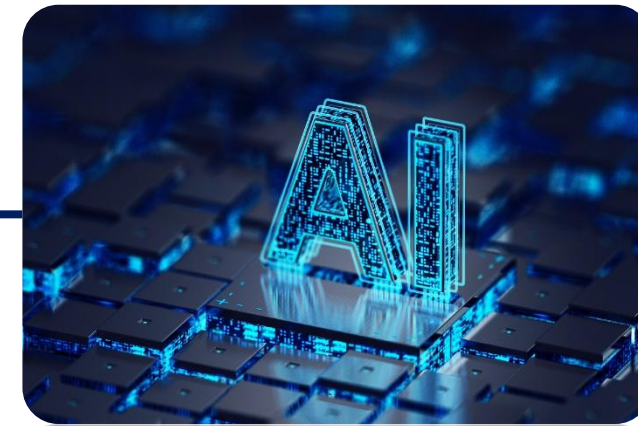
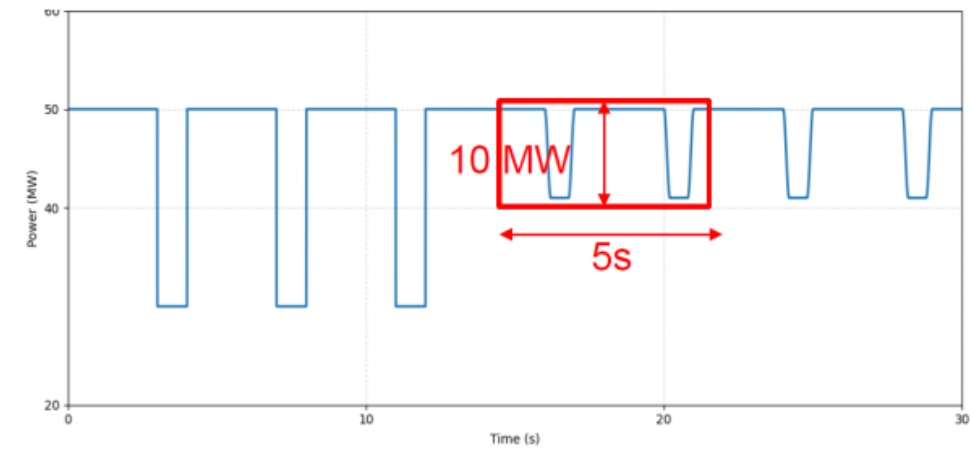
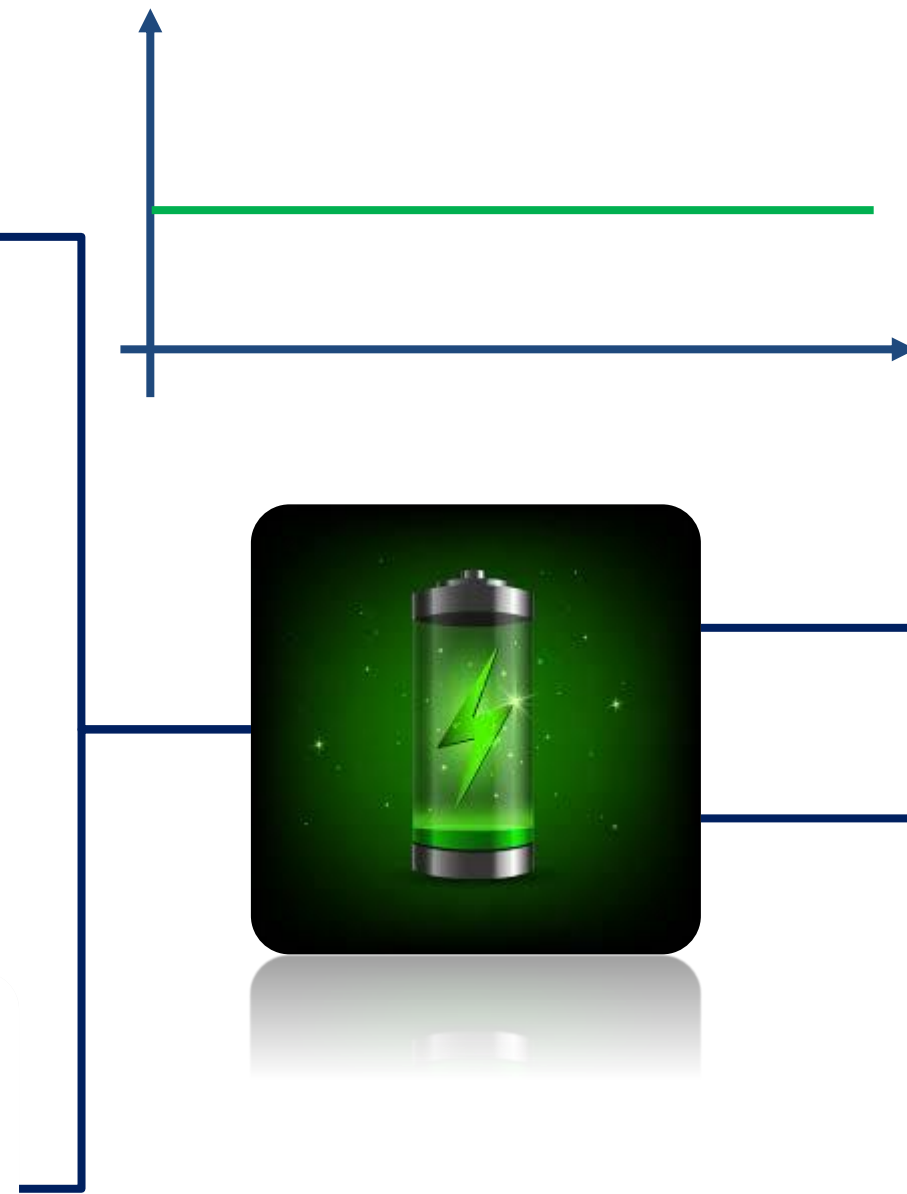
Communication



What is the solution if we we capture it at the site during commissioning or operation?

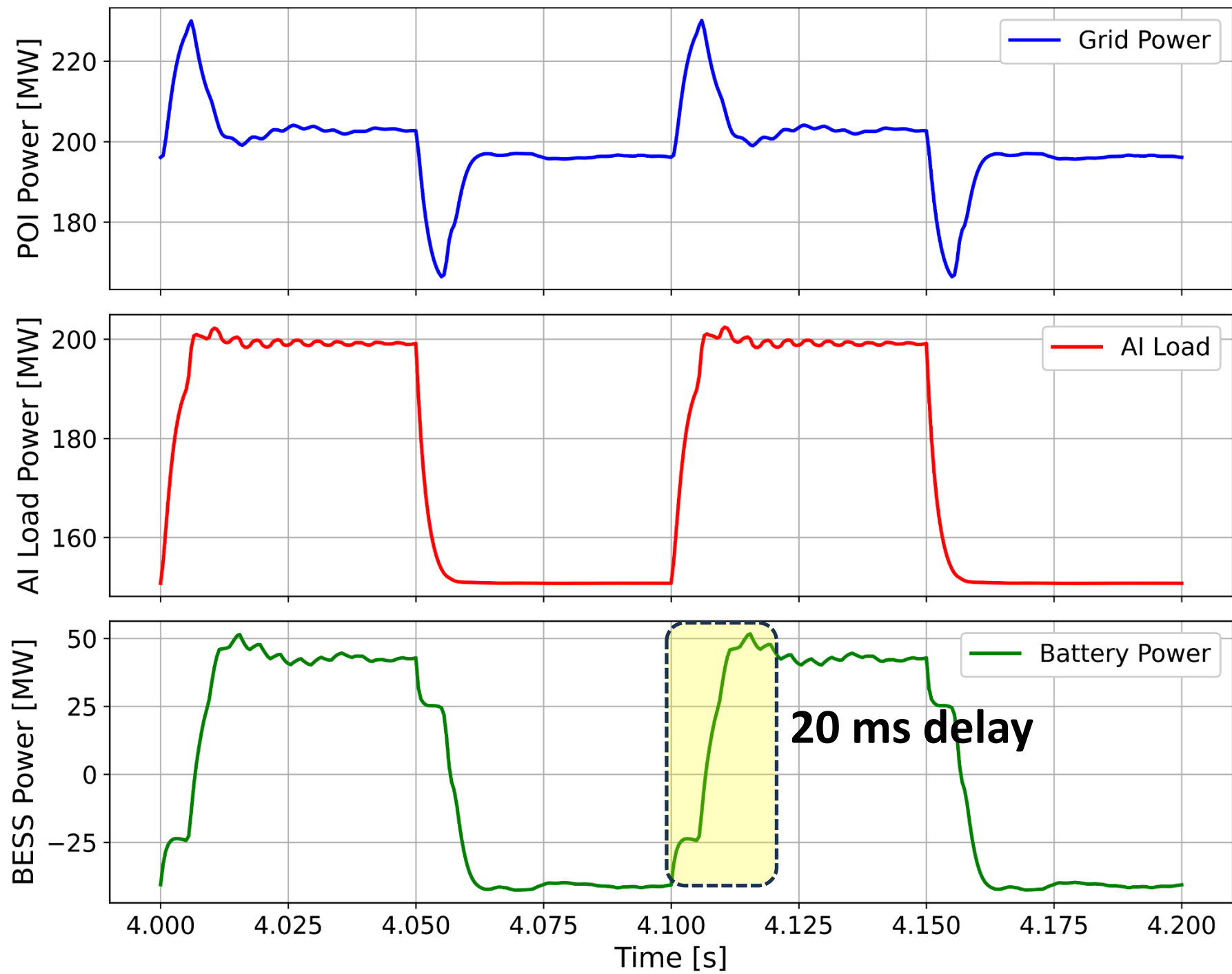
- **Unfortunately, there is no solution (at least I don't know it)**
- **Typical conversations:**
 - **Client: You smart, you can figure that out!**
 - **Me: No, I cannot make the electrons run faster 😊**

Parallel BESS (UPS mode)

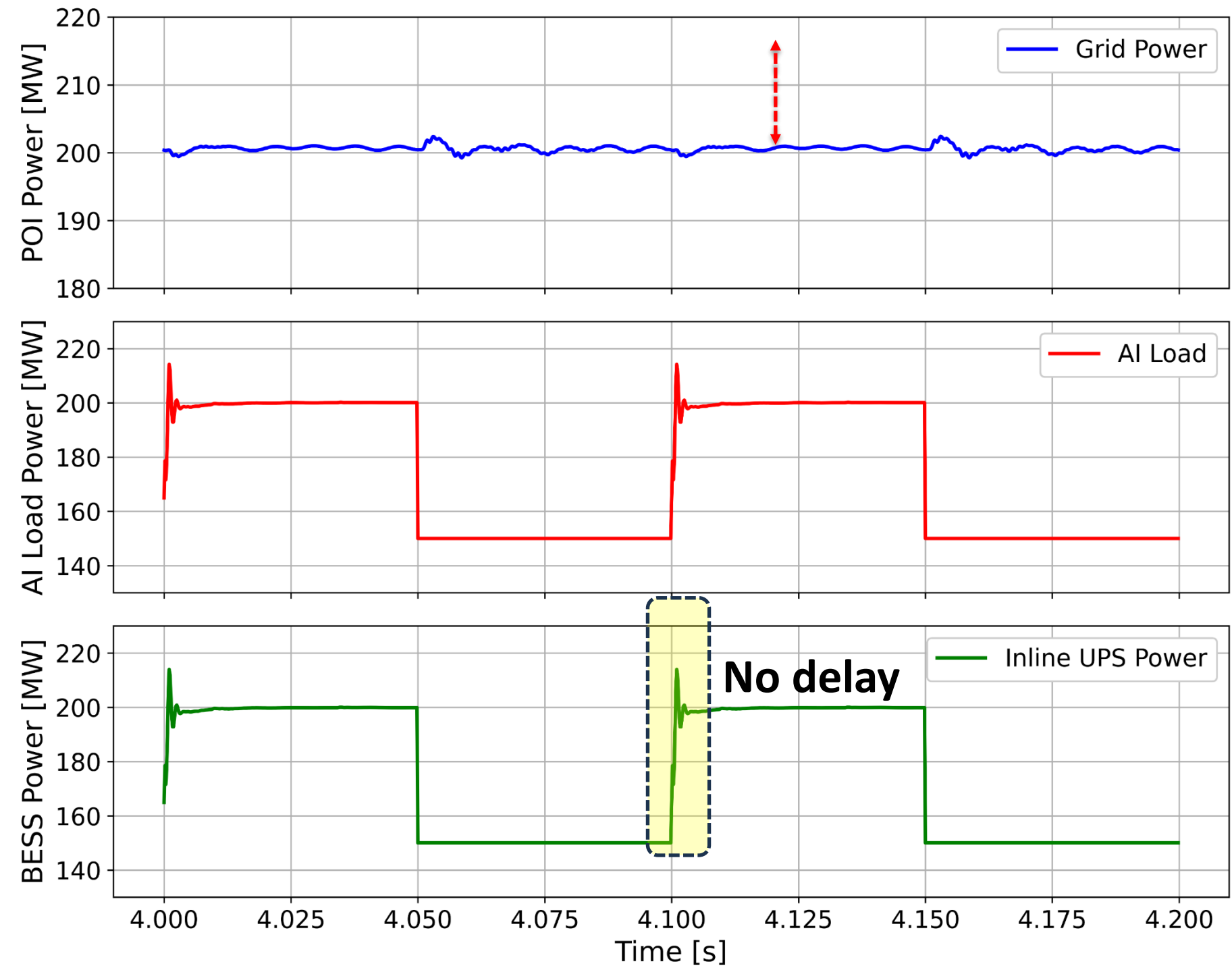


Results (Inline and **Parallel BESS**)

Parallel BESS (20 MW peak Seen at the POI)



In Line UPS BESS (Contant Power at the POI)



End-to-End Project Delivery

Stakeholder Coordination

Coordination with TSPs, utilities, OEMs, and developers

Faster Timelines

Accelerated execution through proactive issue identification

All Project Types

Support for renewable plants, large loads, and hybrid facilities

Proven Results

Track record enabling fast, reliable, and scalable grid integration

Complete Deliverables

Full study packages, model submissions, and compliance documentation



THANK YOU

s.maleki@edgetunepower.com