

EMS SOLUTION



ASIA CLEAN ENERGY FORUM 2026

Beyond Transition: Building Secure, Resilient, Inclusive, and Intelligent Energy Systems

8-11 June | ADB Headquarters, Metro Manila, Philippines

Jonathan Tan



EMS Application



Rural Electrification



Factory Microgrid



Data Centers Microgrid



Microgrid for School/ Institute

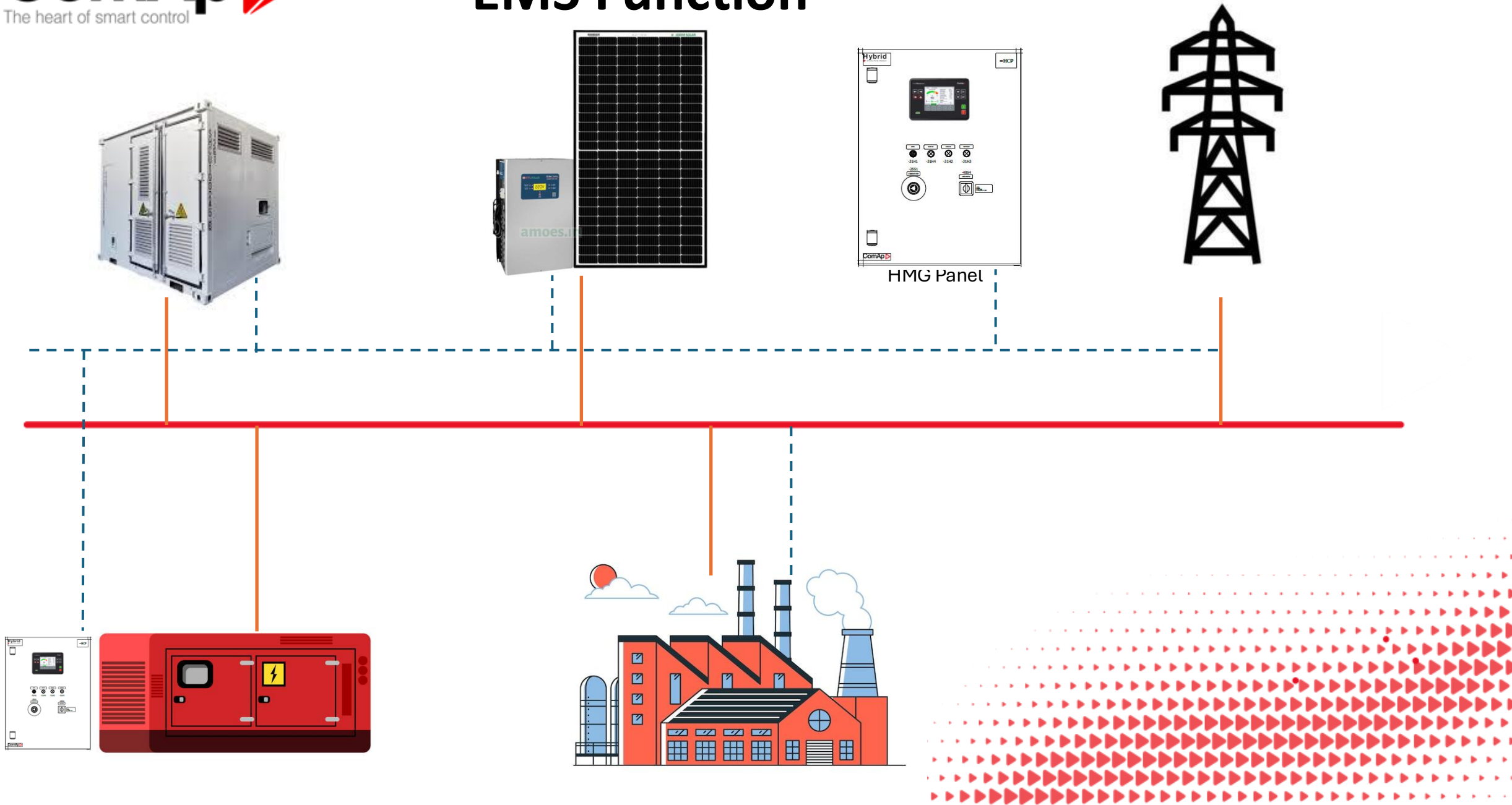


Solar/ BESS Farm



Utility Scale Microgrid

EMS Function



POWER SYSTEM OPERATOR (PSO) OR EMS

TERTIARY CONTROL

Power System Operator (or Energy Management System)

- Control of energy transactions b/w mains & microgrids
- Demand based tariff plans to lower-level power layers
- Dynamic P&Q requests for frequency regulation & kW/kVAr support

Modbus

ENERGY MANAGEMENT SYSTEM (EMS)

SECONDARY CONTROL

Microgrid controls

- V/F regulation to Nominal values
- Optimal dispatch of DER units
- Mutual synchronization & to the upstream power layer
- Import/Export of P/Q control to upstream power layer
- Direct Islanding detection

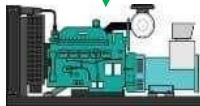
Modbus



Basic V/F or P/Q controls



Basic P/Q controls



Basic V/F or P/Q controls



Charge/Discharge control

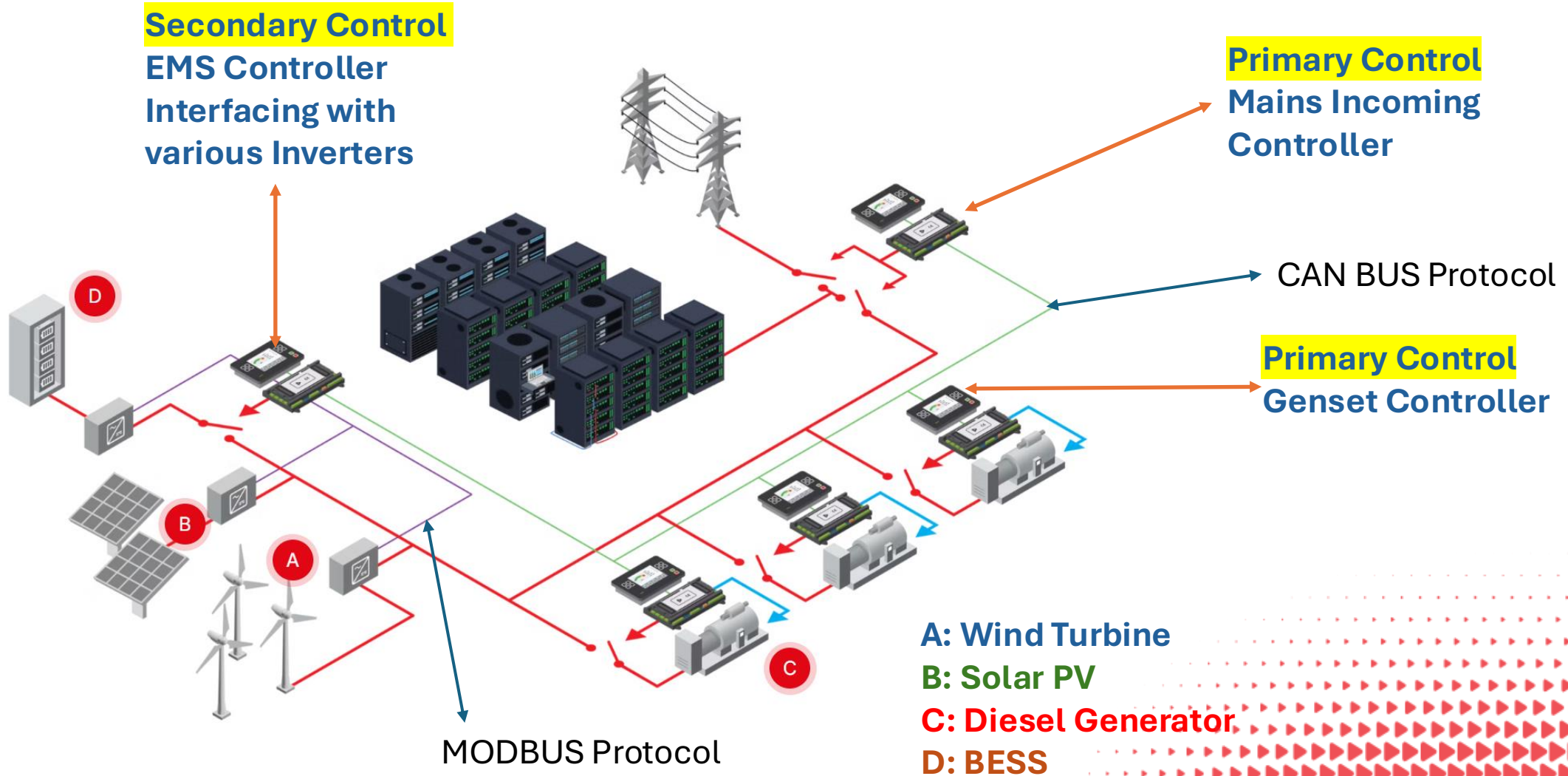


Load connection/disconnection control

DEVICE LEVEL CONTROLLER

PRIMARY CONTROL

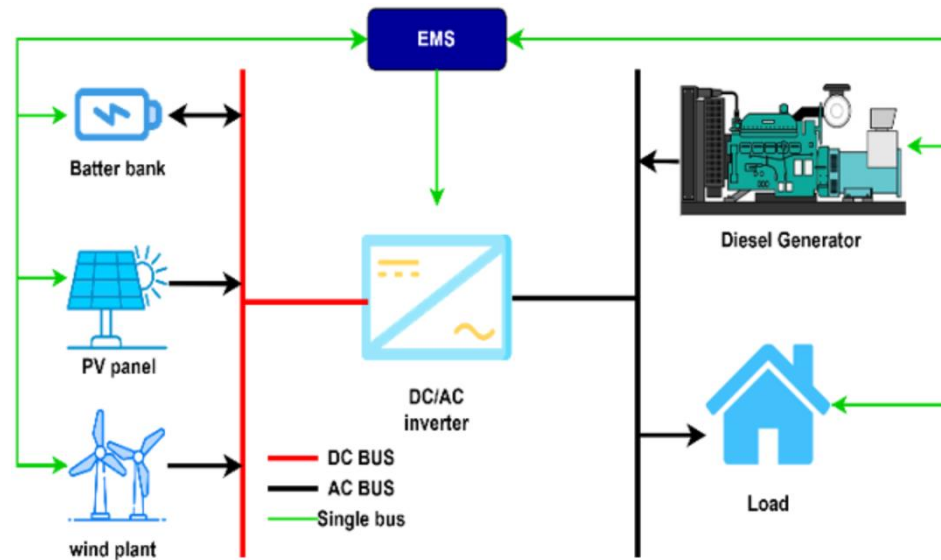
EMS Control Architect



Optimal Dispatch of Power Sources

-To maximize the utilization of green energy (PV/Battery) & minimize diesel consumption

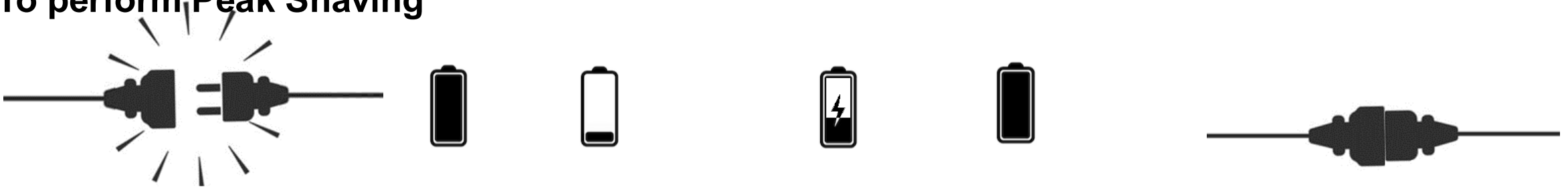
- PV power is produced in maximum to ensure minimum load absorbed from Mains or Gensets
- BESS/Gensets support PV by discharging power to manage intermittency/fluctuations
- PV power when surplus is used to charge the battery & export back to Mains within prescribed limits



Power Management of Sources

-To start/stop the PV, BESS & Generator based on conditions

- To curtail PV power when batteries are charged & total load is lesser than PV output
- To stop charging/discharging BESS based on State of Charge
- To start N numbers of required Generators
- To perform Peak Shaving



Mains
supplying Load

Mains dropout
BESS supplies
load

BESS almost
discharged

Genset started
and supply load
+ BESS charging

BESS charged
and supply load

Mains restored

Grid follow >> Grid forming

Balancing

EMS Expectations

Energy Trading

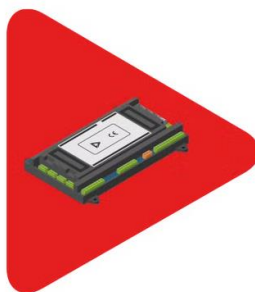
Spot Price Dispatch (SPD) tool detect price change and send it to the microgrid controller
Strategic BESS reserve discharge in the grid



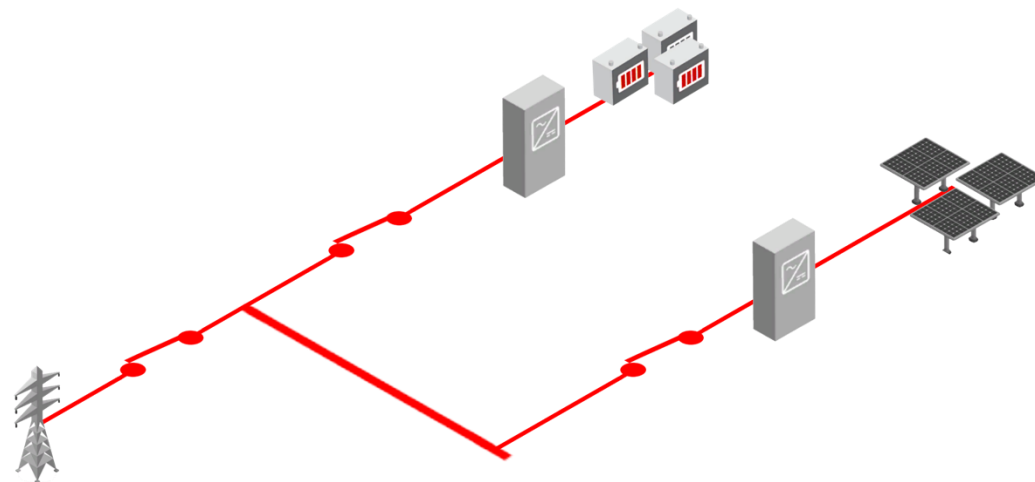
Price is released
by **market operator**



**ComAp's Spot
Price Dispatch**
server analyses
price information



Signal received
by **on-site system**



Microgrid connected
to the grid

PV feeding grid
+ BESS charging

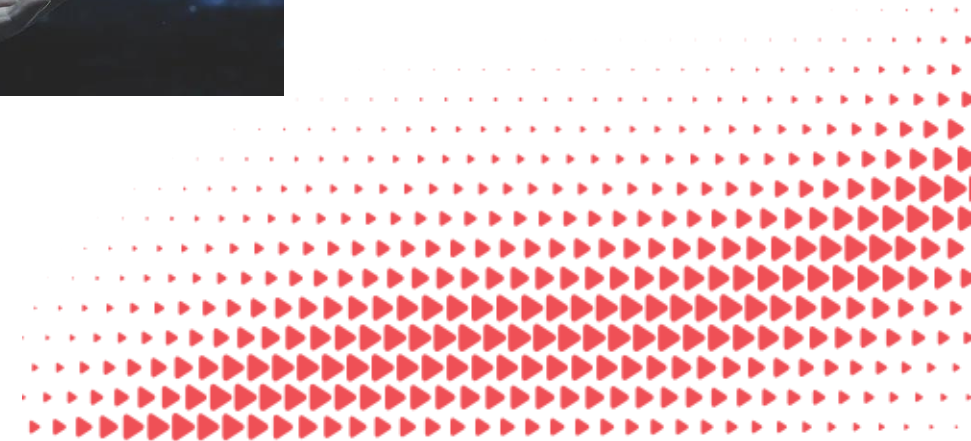
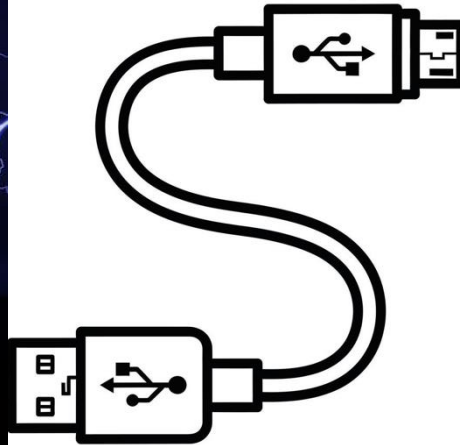
Implementation of SPD management:
Unloading BESS if price is high
Loading BESS if price is low

Spot Price Dispatch signal

Reduce Interruption Of Power To Loads

-To perform seamless transfer

- When there is failure of mains, the BESS can seamlessly take over
- With Battery system heavily discharged, Genset can take over & feed loads
- With resumption of mains, both genset & battery can seamlessly synchronize without any power interruption



Challenges In Microgrid Installation

- **Cyber-Security: IEC 62443 (IACS), ISO 27001 controls relevance, UL 2900 (if applicable to controller)**
- **Microgrid & Interconnection: IEEE 2030.7/2030.8/2030.9 (microgrid controller functions & testing), IEEE 1547 (DER interconnection)**
- **Power quality & protection: IEC 61000 series (EMC), IEC 60255 (protection relays)**
- **Conditions of Equipment on site**
- **Remote Monitoring via Cloud**

CERTIFICATE OF COMPLIANCE

Certificate Number: UL-CA-L337859-437-22900202-9
Report Reference: E337859-20200922
Date: 8-Aug-2023

Issued to: COMAP L.L.C.
5352 Mainsail Dr
P.O. Box 826
Roscoe, IL 61073-0826
United States

This is to certify that representative samples of FTPM7 - Controllers for Use in Power Production Certified for Canada
See Addendum Page for Product Designation(s).

Have been evaluated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: ULC 6200, 1st Ed., Issue Date: 2019-05-31

Additional Information: See the UL Online Certifications Directory at <https://iq.ulprospector.com> for additional information

This Certificate of Compliance indicates that representative samples of the product described in the certification report have met the requirements for UL certification. It does not provide authorization to apply the UL Mark. Only the Authorization Page that references the Follow-Up Services Procedure for ongoing surveillance provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Certification Mark on the product.

ComAp
The heart of smart control

CE:21 – Declaration of Conformity

CE Declaration of Conformity According to Low Voltage Directive 2014/35/EU and Electromagnetic Compatibility Directive 2014/53/EU.

We, ComAp a.s., with its registered seat at U Uranie 1612/14a, 170 00 Praha 7, Czech Republic, IČ 15188657, herewith declare that the following item in our delivered version complies with the appropriate basic safety and health requirement of the Electromagnetic Compatibility Directive No 2014/53/EU and on Radio equipment and Telecommunications Terminal Equipment R&TTE Directive No 2014/53/EU as applied. In case of alteration of the machine, not agreed upon by us, this declaration will lose its validity.

Description of the Unit: Mains supervision controller
Unit type: IM31010MBB, IM31010XBB (IntelMains 1010)

Applicable EC Directives: Low Voltage Directive: 2014/35/EU
EMC: 2014/53/EU

Applicable Standards: EN 61010-1:2010-EN 61010-1:2010/Cor 1:2011-05
EN 61010-1:2010/AM 1:2016/AC:2019-04
EN IEC 61000-6-2:2019;
EN IEC 61000-6-4:2019;

Extension module

Unit type: IGS-PTM; Intel AIN; Intel AIN8TC; Intel IOB8;
IGL-RA15; Intel ADR81

Applicable EC Directives: EMC: 2014/53/EU

Applicable Standards: EN IEC 61000-6-2:2019;
EN IEC 61000-6-4:2019;

RoHS and REACH compliance Declarations of above mentioned product are available at our webpages <https://www.comap-control.com>

Responsible for: Checking for correct application of the appropriate harmonized standards.

In Prague: August 26, 2021

Authorized Signature:

Mark Novotný
R&D Director

ComAp a.s.
U Uranie 1612/14a
170 00 Praha 7
Czech Republic

Tel: +420 246 012 111
HotLine: +420 246 012 666
e-mail: info@comap-control.com
www.comap-control.com

Note:
The Low Voltage Directive requires that the last two digits of the year in which the CE marking was first affixed is given in the Declaration of Conformity.

IEC		Ref. Certif. No.
IECEE		CZ-3227
IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE)		
Certificate of Conformity – Industrial Cyber Security Capability		
Type	Process Capability Assessment	
Name and address of the applicant	ComAp a.s. U Uranie 1612/14a, 170 00 Praha 7 - Holešovice, Czech Republic	
Certificate Coverage (including Version)	Product security development life-cycle (based on the document IEC62443-4-1 process application sheet ver.1 Date:3-31-2023)	
Standard	IEC 62443-4-1:2018	
Requirements Assessed	Security management (12/1/13), Security requirements (5/0/5), Secure by design (4/0/4), Secure implementation (2/0/2), Security verification and validation testing (5/0/5), Management of security-related issues (0/0/5), Security update qualification (4/1/5), Security guidelines (7/0/7)	
Additional information (if necessary may also be reported on page 2)	Maturity Level 2 - Managed	
As shown in the Test Report Ref. No. which forms part of this Certificate	242969-02/01 of: 31.03.2025	
This Certificate of Conformity, issued by the National Certification Body, certifies that the above have been found to be in conformity with the requirements of the Industrial Cyber Security Capability Scheme (IECEE OD-2061) as it relates to the claims declared by the Applicant.		
Elektrotechnický zkušební ústav, s. p. Pod Islem 129/2, Troja, 182 00 Praha 8 Czech Republic		
Date: 31.03.2025	signature Miroslav Sedláček Certification and Inspection Manager	

CERTIFICATE

This is to certify that

ComAp a.s.

U Uranie 1612/14a
170 00 Praha 7
Czech Republic

with the organizational units/sites as listed in the annex

has implemented and maintains a **Quality Management System**.

Scope:

Research and development, production, sales and support of products and services for power control solutions in the power generation and energy management industries.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 9001 : 2015

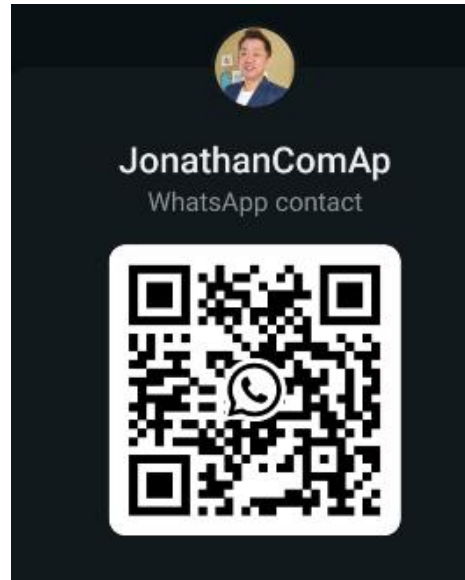
Certificate registration no. 31150672 QM15
Valid from: 2025-10-20
Valid until: 2028-10-19
Date of certification: 2025-10-20

DQS GmbH

Guido Eggers
Managing Director

Accredited Body: DQS GmbH, August-Schneer Straße 21, 68463 Frankfurt am Main, Germany
Administration Office: DQS GmbH, August-Schneer Straße 21, 68463 Frankfurt am Main, Germany
The validity of the certification can only be verified by the DQS code.





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