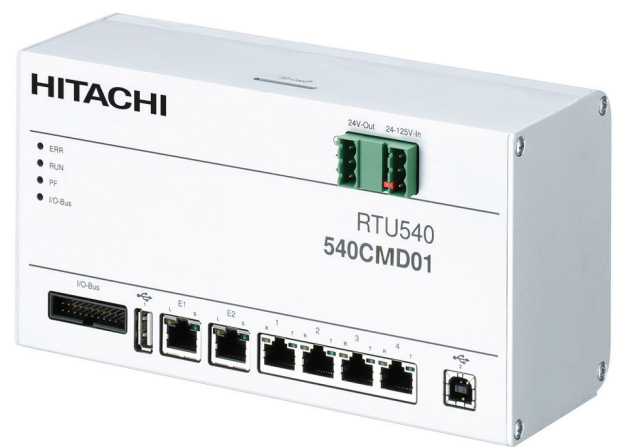


GRID EDGE SOLUTIONS

e-mesh Control Power Management and Insight

Unlocking potential across traditional and renewable energy assets to reduce environmental footprint and boosting profitability



Why energy management?



Climate and Environment Sustainability

- Maximized efficiency of traditional and distributed energy asset
- Protects the environment by improving resource efficiency
- Integration of multiple energy resources
- Minimize renewable curtailment
- Maximizes renewables utilization to reduce carbon footprint



Control and SCADA Solution for DERs

- Advanced power system functions, like seamless grid integration and grid code compliance
- Strong and resilient cybersecurity features
- Ensures power to critical loads during outages
- Standard interfaces between Control, SCADA and EMS solution



Energy Costs and Profitability

- Maximize value of each asset to provide quick return on investments
- Supports agile migrations as well as functional and software extensions to safeguard the investments
- Maximum availability of all connected energy assets
- Reduces cost of energy and operation by optimizing distributed energy resources

Element		Details	Features		
e-mesh Control based on Hitachi Power Grids' robust, modular and scalable RTU platform.	Utility	e-mC – BESS-PPC	Battery Energy Storage System Power Plant Controller	<ul style="list-style-type: none"> • SoC management and balancing • F/P & U/Q/PF control, seamless transitions 	
		e-mC – LUC	Line Up Controller (a Line Up is defined as the ensemble of a power converter, the battery bank connected to it and the related auxiliary systems). Modular plant design is based on placing multiple Line Ups side by side.	<ul style="list-style-type: none"> • Grid support mode (frequency and voltage droop support) • Grid Synchronization • Planned islanding • Direct active power set points • Overload intermittency support • Peak shaving • State of Charge (SoC) management and balancing 	
		e-mC- RA	Renewable (PV, wind) power plant control	<ul style="list-style-type: none"> • Active power curtailment with grid code compliant ramp rate limiter • frequency support • PV active / reactive power sharing • Renewable smoothing • Reactive power regulation • Capacitor bank management • Battery energy storage automatic recharge 	
	Microgrids	managed assets	e-mC-P	PV inverters	<ul style="list-style-type: none"> • Smoothing • Renewable curtailment • Step load requirements • P & Q sharing,
			e-mC-E	Battery energy storage system	<ul style="list-style-type: none"> • SoC management • F/P & U/Q control, P & Q sharing • Grid support mode • Direct active power set points • Renewables intermittency and generators overload/underload support • Step load & spinning reserve • Peak shaving/shifting, seamless transition
			e-mC-G	Fossil fuel generators	<ul style="list-style-type: none"> • Ideal loading of power set points • Step load requirements • Spinning reserve • P & Q sharing • Remote voltage control, etc.
			e-mC-W	Wind turbines	<ul style="list-style-type: none"> • Smoothing • Renewable curtailment • Step load requirements • P & Q sharing, etc.
			e-mC-N	Grid / network interface	<ul style="list-style-type: none"> • Grid synchronisation • Planned islanding, seamless transition • Q/U/PF control • Peak shaving/shifting
	Connectivity	e-mesh Control> e-mesh Power Store	Modbus Serial (master)		
		e-mesh Control > e-mesh EMS	Modbus TCP/IP (slave) or IEC 60870-104(slave)		
e-mesh Control > e-mesh Monitor		Modbus TCP/IP (slave)			
3rd party / customers' applications		Modbus / IEC 60870-104 / DNP3 / IEC61850			