

## GRID EDGE SOLUTIONS

# e-mesh EMS

## Energy Management and Insight

Improve energy efficiency, optimize production, boost profitability and reduce environmental footprint with insights into energy prices, loads and renewable forecasts



### Why energy management?



#### Climate and Environment Sustainability

- Reduce CO<sub>2</sub> emitting generators reliance by optimally integrating renewables and storage systems
- Minimize renewable curtailment
- Enable being carbon-neutral and improve company image
- Help being compliant with environmental targets and regulatory framework



#### Aggregation, Coordination and Optimization of DERs

- Dispatch operational set-points to the assets considering system end uses constraints
- Increase flexible capacity
- Exploit load and renewable forecast to predict asset behaviors and avoid energy unbalances
- Enable asset planning to ensure system reliability and availability
- Combine and coordinate multiple and distributed energy resources as a single entity (VPP)



#### Energy Costs and Profitability

- Leverage prices, load and renewable forecast to optimally compute power dispatch of all assets
- Exploit fuel consumption curve to optimally operate conventional generators
- Minimize peak load and demand charges to maximize value of each asset to provide quick return on investments
- Creates new business opportunities through the participation into energy and ancillary service markets

Release 2.0	Element	Details		
<b>Managed assets</b>	PCC	All assets are virtually connected to the point of common coupling		
	Diesel Generators	Continuous setpoint		
	Energy Storage	Continuous setpoint		
	PV plant	Controllable and non-controllable PV plants. Continuous setpoints		
	Wind plant	Controllable and non-controllable Wind plants. Only continuous setpoints		
	Loads	Controllable and non-controllable loads. Continuous and discrete setpoints		
	EV charging infrastructure (EVCI)	Continuous and discrete setpoints, battery recharge and preconditioning		
<b>Optimization</b>	Intra-day	Synchronous optimization automatically executed every 15 minutes according to a 24 hours receding horizon framework Compute economic dispatch		
	Day-ahead	Asynchronous optimization requested by the user Enable day-ahead market participation and trading		
	Offline	Asynchronous optimization requested by the user Helps in planning and schedule maintenance activities		
<b>Connectivity</b>	e-mesh SCADA	Modbus TCP/IP (slave)		
	e-mesh CONTROL	Modbus TCP/IP (master) IEC 61870-104		
	3rd party / customers' applications	Modbus TCP/IP (slave)		
	Forecast provider (e.g., renewable, load and energy price)	Secured and authenticated Web APIs		
<b>Users</b>	Guest	4 default user roles with specific permissions	Read and view data	
	Operator	Possibility to modify both user roles and permissions	Read and view data, enable/disable workflow and commands, view parameters	
	Engineer		Read and view data, enable/disable workflow and commands, run offline optimization, view and edit parameters	
	Administrator		Full access	
<b>SW &amp; HW Requirements</b>	Hardware	e-mesh™ EMS runs on an Industrial PC	CPU	Intel Core i7-6820EQ Processor
			RAM	8 GB DDR4 2133 MHz RAM
			Hard disk	256 GB SSD
			Ethernet adapter	Any adapter supported by the operating system
			Input	Keyboard/mouse
			Output	Display
			Installation	USB port
	Software and OS	e-mesh™ EMS relies on microservices and containers technology	OS	Linux Ubuntu Server 18.04.X LTS
			Docker CE	LSB stable release
Web browser			Chrome with support to TLS 1.2 or TLS 1.3	