



5G Electric Mobility Living Lab

**Energy Management Powered by BOSS —
A Leader in Smart Installation to Grid Technology**

**Energy communications, services, visibility, and control made easy, secure, and resilient
for smart-buildings, mobile assets and microgrids**

BOSS is a Smart Installation to Grid Technology Solution Provider

Energy Software as a Service (ESaaS) & Atmospheres®:

- Cost-effectively retrofit installations with smart technology
- Secure grid and cloud connection
- Advanced energy & operational savings
- Data analytic services
- B2B energy trading - Virtual Power Exchange (VPE) packaged in a unique business model for the 21st century



- **COMPONENT CONNECTIVITY**
- **ENERGY AND COMPONENT CONTROL**
- **CYBER SECURITY**
- **DATA ANALYTICS**
- **COST REDUCTION**



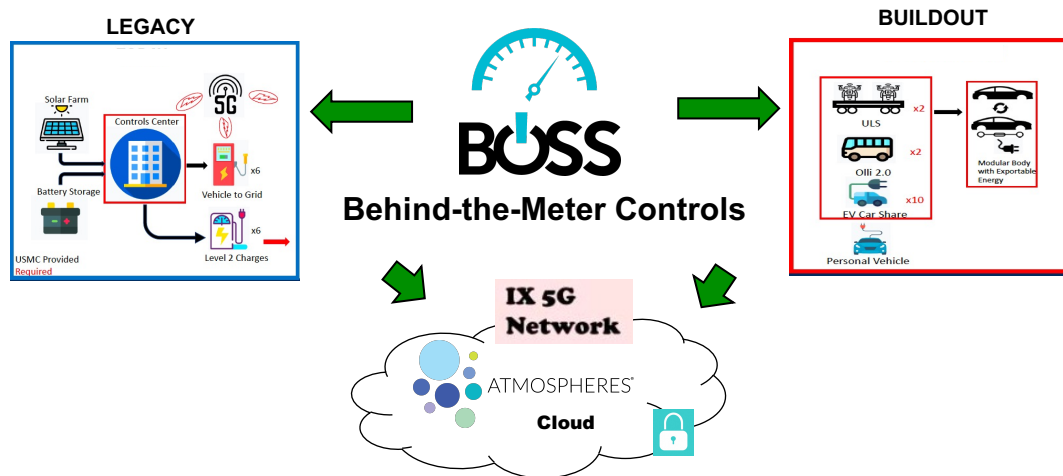
- **AUTOMATION**
- **RESILIENCY & HIGH AVAILABILITY**
- **ENERGY INDUSTRY LEVERAGE**
- **INTEGRATED DERMS**



- **VPE - VIRTUAL POWER EXCHANGE**
- **WITHIN BASE & BASE-TO-BASE**
- **EDGE COMPUTING PROSUMER POSITION**

Solution

- BOSS behind-the-meter control to enable all components
- Integrated and enhanced legacy components
- Distributed Energy Resource leverage
- Dedicated, secure IoT network and module
- Aggregated and managed through Atmospheres®
- Connection to energy market and grid, real-time
- Leads to energy and operational savings & leverage



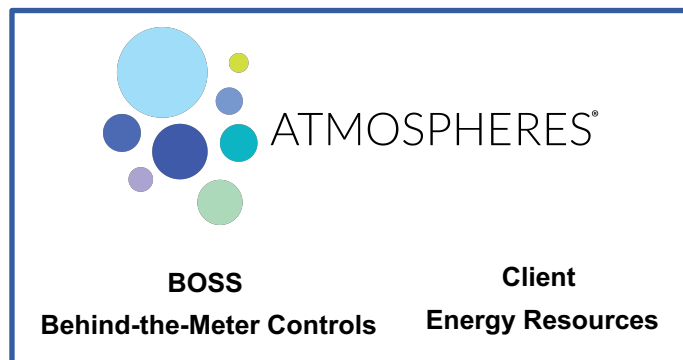
Atmospheres connects devices, legacy systems and storage / generation to provide perpetual savings and data analytics

Reduce Energy Use	Peak Load Management	Demand Response	Wholesale Market Link	Predictive Central Maint.	Extend Equipment Life	Reduce Operating Risk	Resilient & Secure	Data Analytics
Save about 50% of the Energy at the Plug	Reduce PLC Transmission & Capacity Charges -- up to 40%	Participate in Supplier Programs that Pay for Voluntary Reduction	Sell Excess Demand or Generation for Profit	Alert Before Catastrophic Failures	Reduce run-time and preventative maintenance	Monitor Power Consumption (health) on Each Device	Secure, interconnected devices for power sharing & shifting	Energy and power data correlation for decision optimization & 3 rd party leverage

1. **Atmospheres®**: Cloud-based software operating platform: enabling third party apps and IoT devices; securely connecting installations to the energy grid and Internet; intelligently managing energy usage while providing automated onsite data analytics; reporting; and management to optimize costs
2. **Grid Edge Router**: A decentralized, dedicated IoT network providing 99.999% communications reliability, no single points of failure, and end to end IT/OT security (Auto detect and correct security mgmt.)
3. **BCM**: BOSS Control Module (BCM) - embedded module technology licensed to OEMs with reference designs to build behind the meter (BTM) sensors/controls and distributed energy resources (on-site or large microgrids). Automatically connects to the **VPE®** and complies with emerging standards- IOTEA, OpenDR, IEEE, NiST
4. **BTM Controls and DER**: BOSS Controls and third party behind the meter sensor/controls and onsite distributed energy resources (DER)
5. **Unique Business Model**: Lifetime value of control model with no up-front cost - BOSS works with utilities, deregulated energy resellers, and others to provide the ESaaS solution to the end customer and paid for through their energy contracts

Installation
existing
capabilities

+



=

- 30% usage/cost reduction
- Peak load management
- Demand Response
- Increased Dist. Energy Resource usage
- Advanced energy & operational savings

BOSS Atmospheres® Installation to Grid Automation

Installations benefit from automated smart installation IoT control and data analytics, while optimizing energy usage by being connected, real time, to energy markets

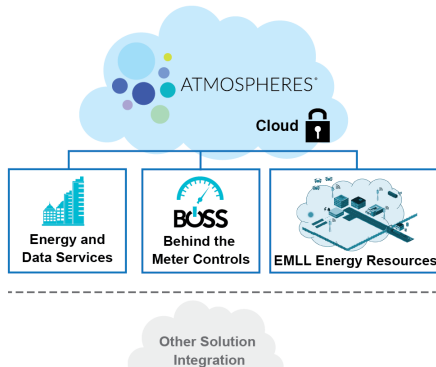


The Virtual Power Exchange (VPE) is the first energy market settlement system and DERMs at the installation level.

- Enables a **transactive energy market**, backed by a globally regulatory compliant distributed ledger technology and industry leading **installation-to-grid IoT**
- Allows for real time **peer-to-peer energy transactions** and control, based on current and future market conditions
- Creates a market for **distributed energy resources (DER)** (battery, solar, wind, generator) and **behind-the-meter smart controls** for each electrical junction point
- Provides a virtual DERMs and accounting capabilities, **priced by device**, at individual installation, region, aggregate, and utility views



Electric Mobility Living Lab



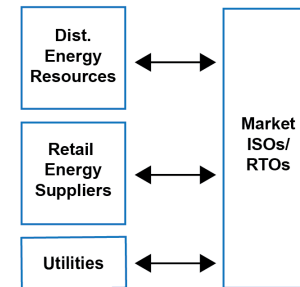
VPE

Secure and resilient energy transaction sourcing, brokering, and settlement

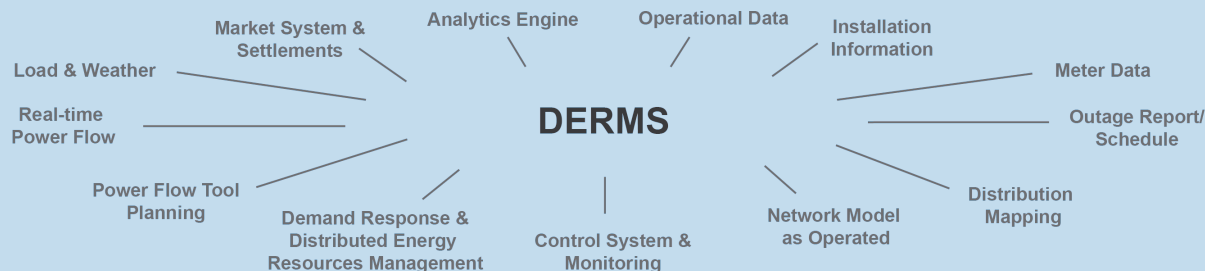
- Identification & issuance
- Wallets & smart contracts
- Decentralized exchange
- Policy engine
- Controls & data analytics
- Automation algorithms
- Distributed ledger with immutable record of all transactions

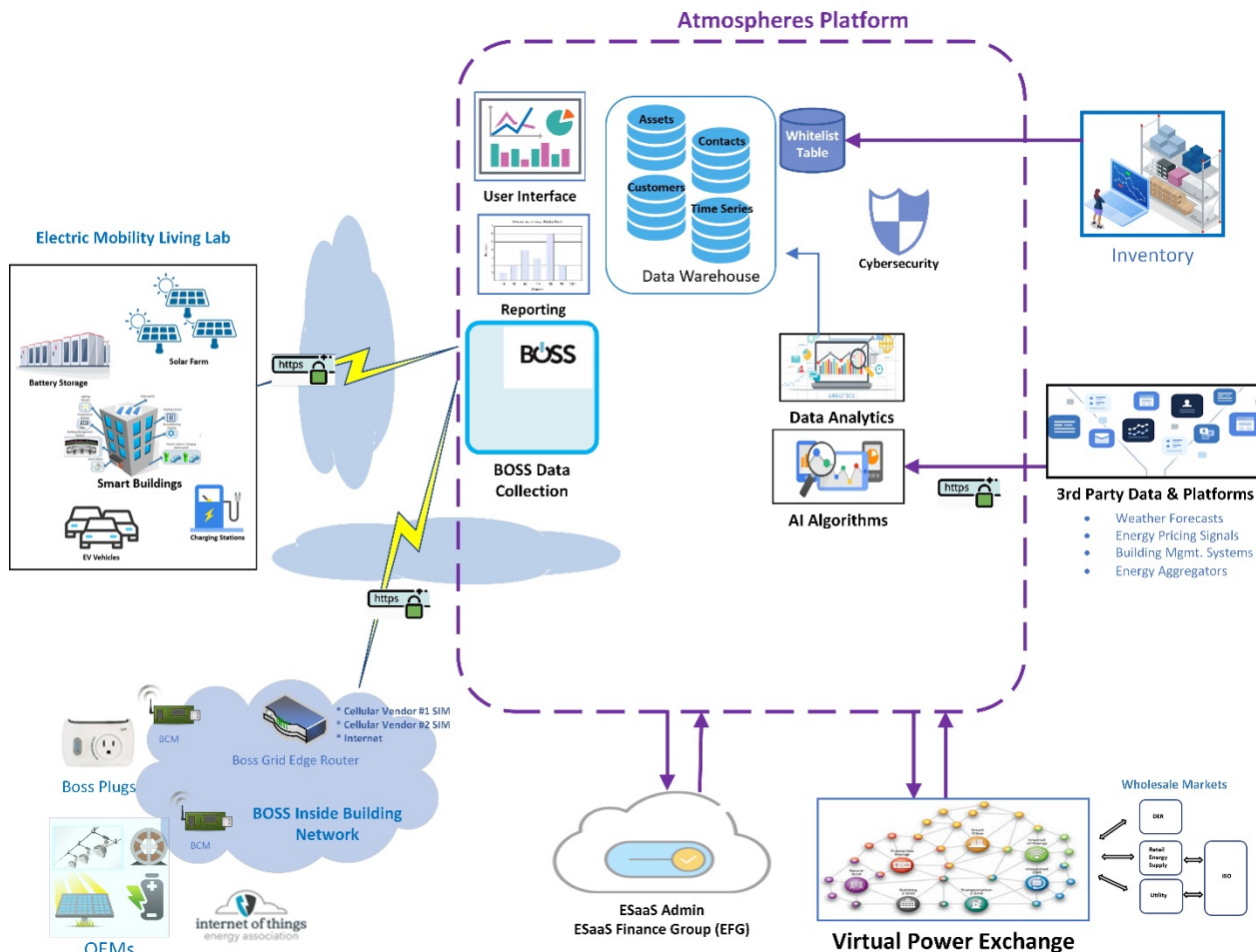


Energy Markets



VPE provides Distributed Energy Resource Manangement functionality.





The Internet of Things Energy Association (IoTEA) was established for three reasons.

1. **Raise awareness** regarding the vital nexus among electricity, communications, data, and the Internet and the need for advanced protections.
2. **Strengthen the nexus** between private sector and government “Internet of Things” stakeholders and enable the technology for the industry.
3. **Develop industry standards** and testing for interoperability, IT and OT cybersecurity and safety for technologies that leverage the Internet of Things, especially those connecting to the nation’s power grid.

- The Internet of Things is becoming ubiquitous.
- The energy industry is transforming to a decentralized, networked, sustainable, renewable, clean, and secure energy grid with smart controls, IoT data services, and behind the meter energy storage and generation.
- A public-private collaboration is needed for new standards, interoperability testing, and technology licensing.
- IoTEA represents industry and government at the critical juncture of communications, data, the Internet, and electricity.
- Together, we hope to discern the standards by which IoT devices are developed and implemented, providing an IoTEA “seal of approval”.
- Paving the way for installations and all associated “Things” to be transformed into smart installations and “Things”, connected to the grid and the Internet
- Ultimately managing the challenges of the twenty first century energy grid.