

Energy Efficiency and Grid Services For C Stores & Supermarkets

***Presented By
John Wallace
Emerson Climate Technologies Retail Solutions***

July 24, 2015



Retail Solutions Business At-A-Glance

Our Mission

Provide Energy Management Systems & Cloud Based Services To Help Our Customers Achieve Operational Excellence In The Areas Of Energy, Maintenance & Food Quality

Our Footprint

- 22K+ Supermarket Installations
- 25K+ Small Format Installations
- 16K+ Sites Utilizing Cloud Services
- 800K+ Cargo Containers With Monitoring

Vertical Markets



Supermarket



Non-Supermarket Food Retail



Refrigerated Transport



Solutions Portfolio

Controls Infrastructure

Refrigeration
HVAC
Lighting
IAQ
Load Management
Store Mechanicals

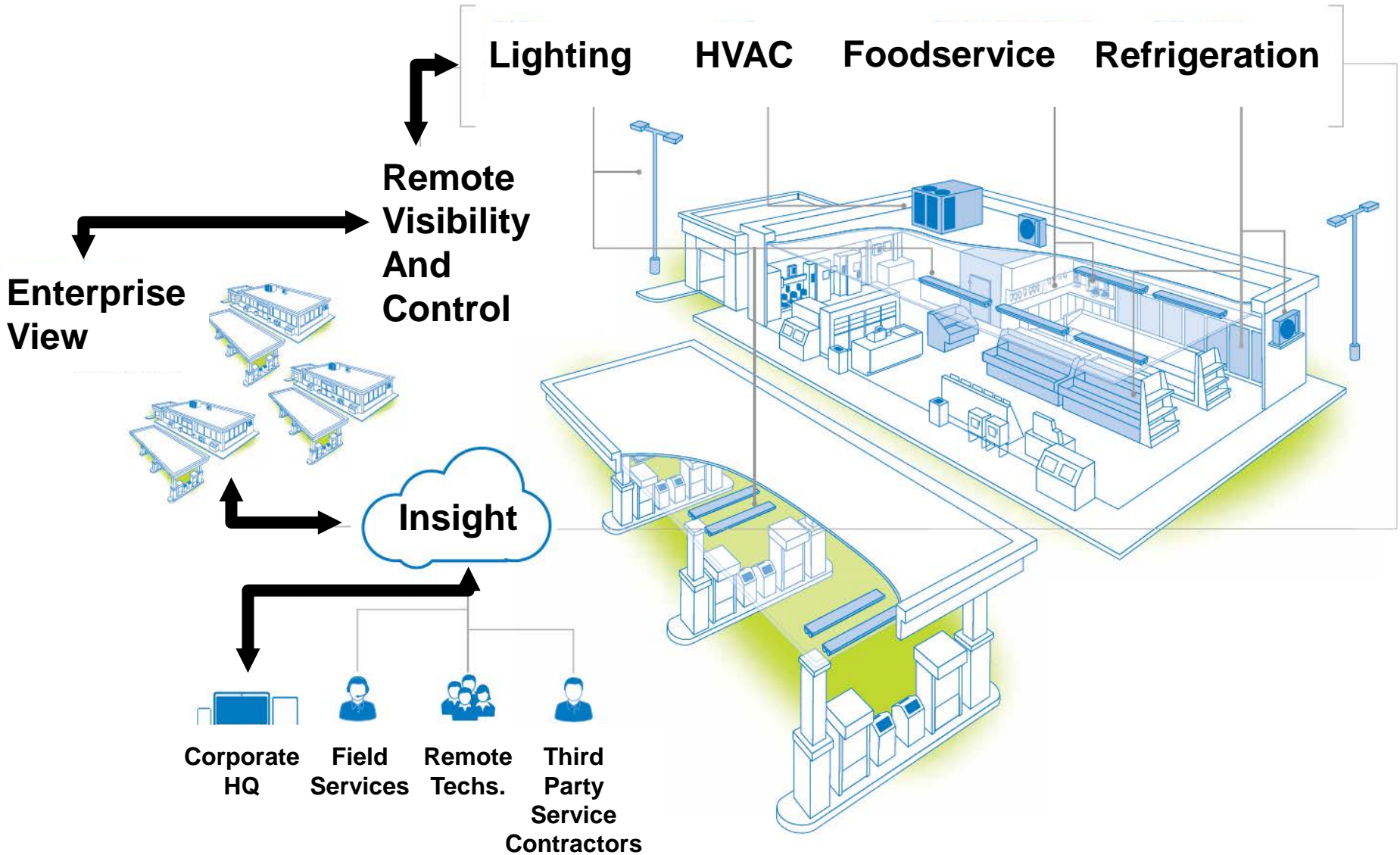
Field Services

Turnkey Projects
E-Commissioning
N-Commissioning

Enterprise Services

Site Administration
Alarm Management
Smart Dispatch
Setpoint Management
Food Quality Reports
Energy & Maintenance Reports
Demand Response

Anatomy Of An Intelligent Convenience Store / Restaurant / Supermarket

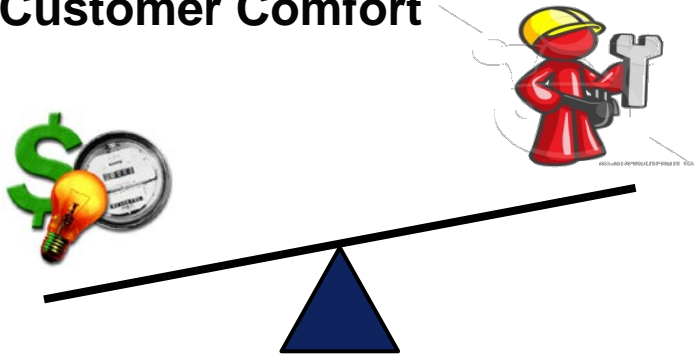


Energy Management Is A Key Part Of Retail Operations With Major Impact On The “Bottom Line”

Challenges & Opportunities

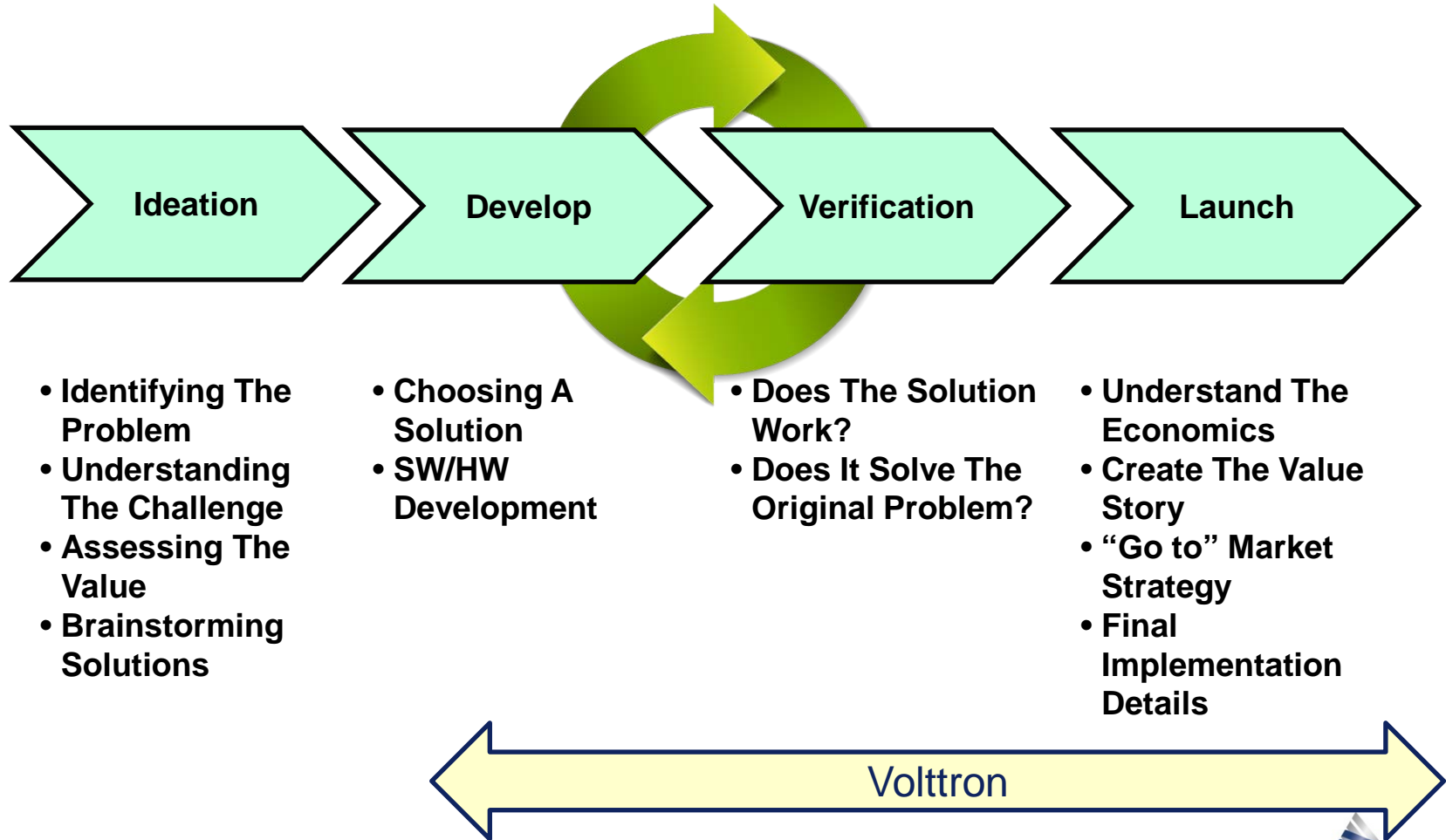
- Energy Cost
- Managing Peak Demand
- Integration Of Renewables
- Equipment Maintenance
- Diagnosing Failures
- Customer Comfort

- Typical Supermarket Spends Appx \$300K On Utilities
- Typical Small Box/C Store Spends Appx \$50K On Utilities

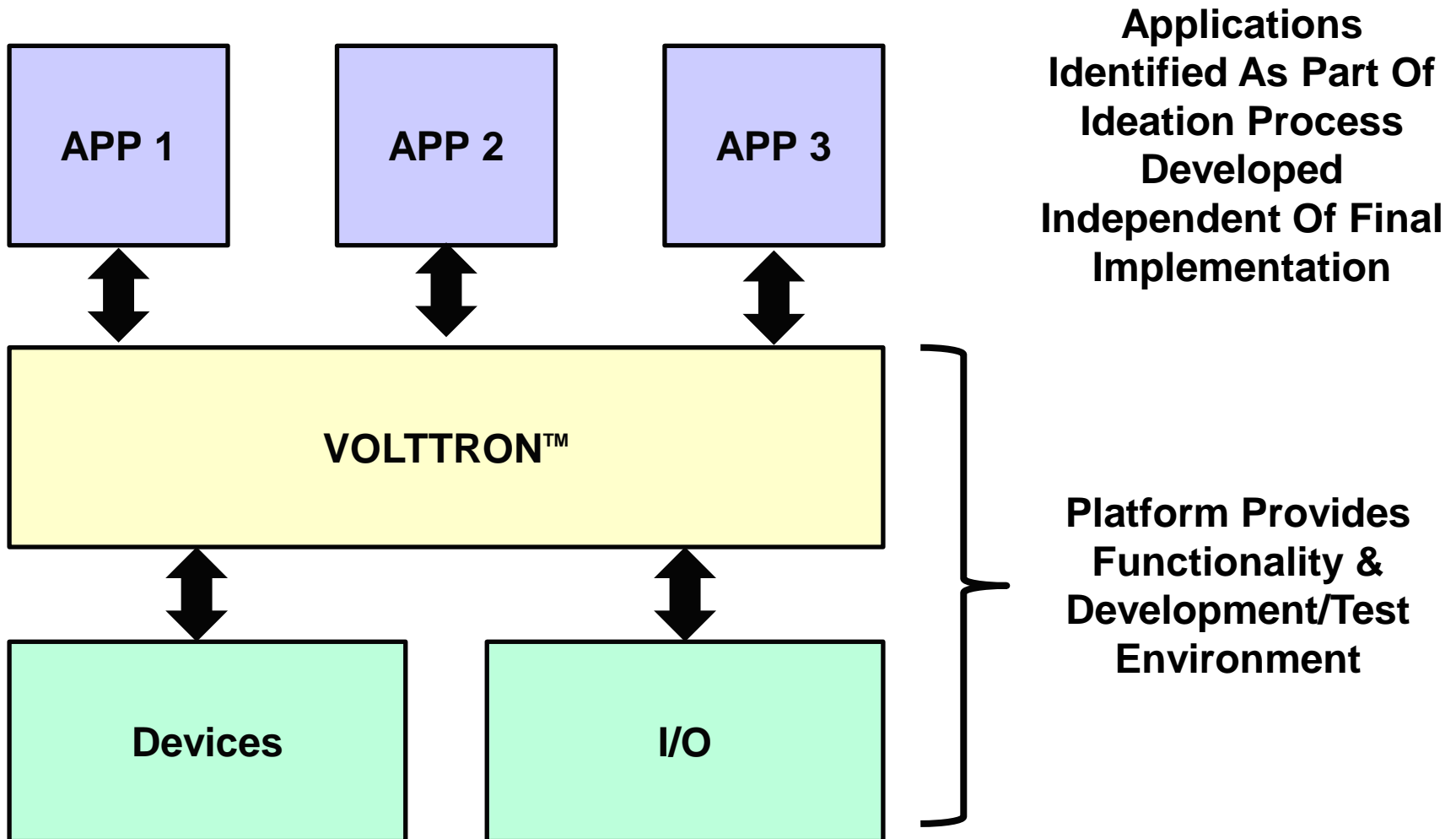


Maintenance Practices & Equipment Failures Have A Considerable Impact On Energy Costs

Multiple Challenges Must Be Managed When Commercializing New Technologies

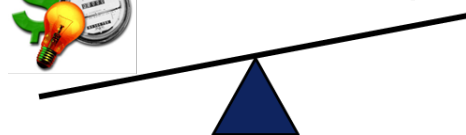
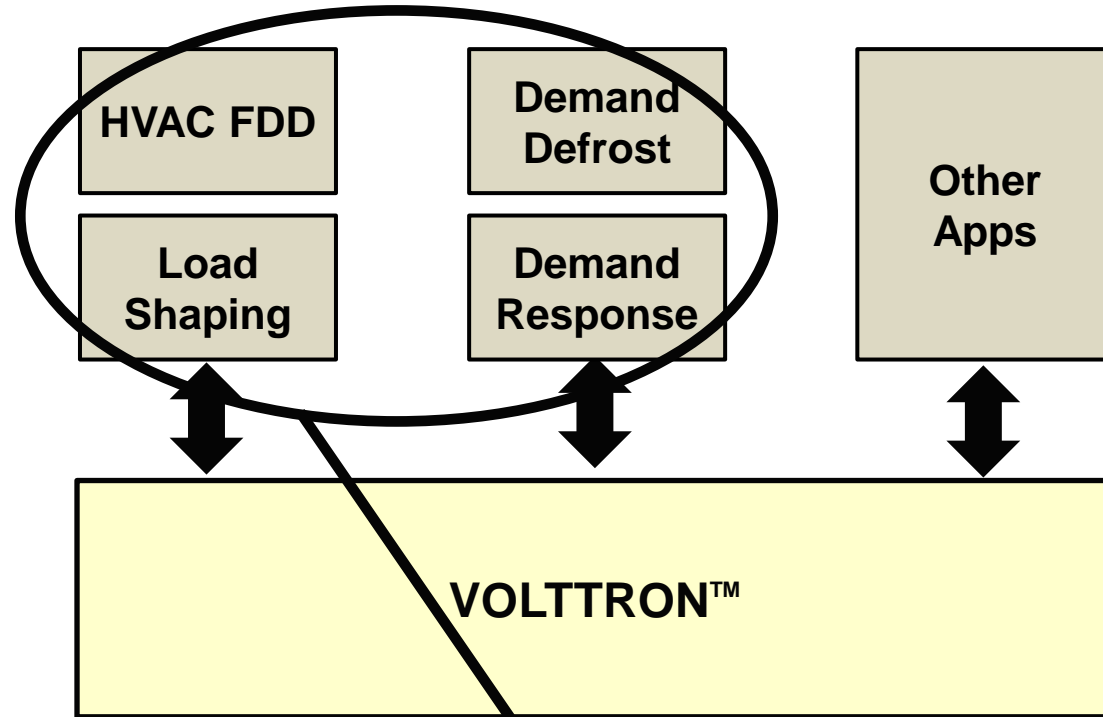


VOLTTRON™ Provides Consistent Platform For Application Development



Application Examples

Open Source
Applications Being
Developed By Labs &
Others Under DOE
Funding

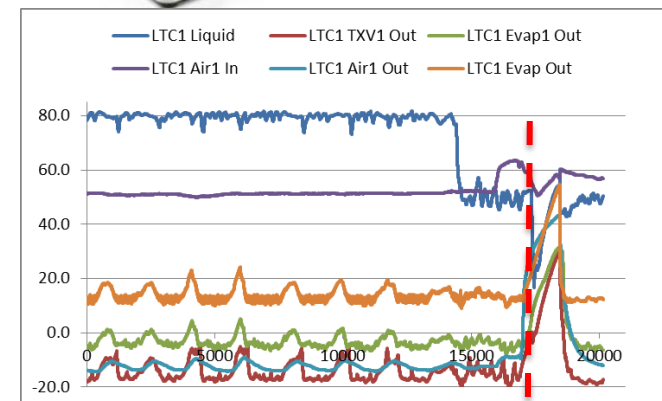
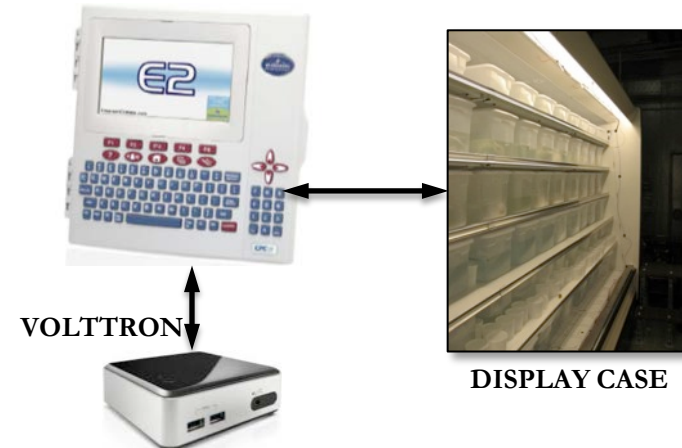


Could Be Utilized By New
Sites & Installed Base To
Address Challenges And
Further DOE's goals

Demand Defrost App Utilized Platform For Development

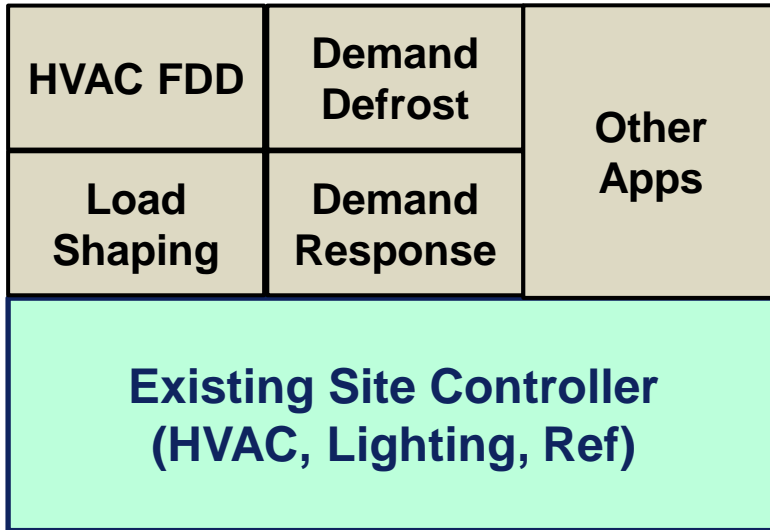
Demand Defrost

- Problem:**
 - Frost Formation On The Evaporator Coils Decreases System Operational Efficiency
 - Typically **Defrost Cycles Are Timed** And Based On 75°F Dry Bulb Temperature And 55% Relative Humidity.
 - Low Temp Cases: ~720kwh/Month/Case Defrost Energy
- Solution:**
 - Utilize Existing Temperature Measurements (Discharge Air Temp) And Develop Algorithms To Perform Defrost On-demand.
 - Retrofit **Volttron Platform** And Control App To **Emerson E2 Controller** To Perform On-demand Defrosting
- Results**
 - Testing Data Collected At ORNL Demonstrated Savings Potential
 - Application Developed And **Field Testing At Emerson Labs**, Sydney, OH – Testing Data Showed Up To 75% Reduction In Defrost Energy (39,650 – 57,900 Kwh/Store/Year)
 - Emerson Interested In Adopting The Application



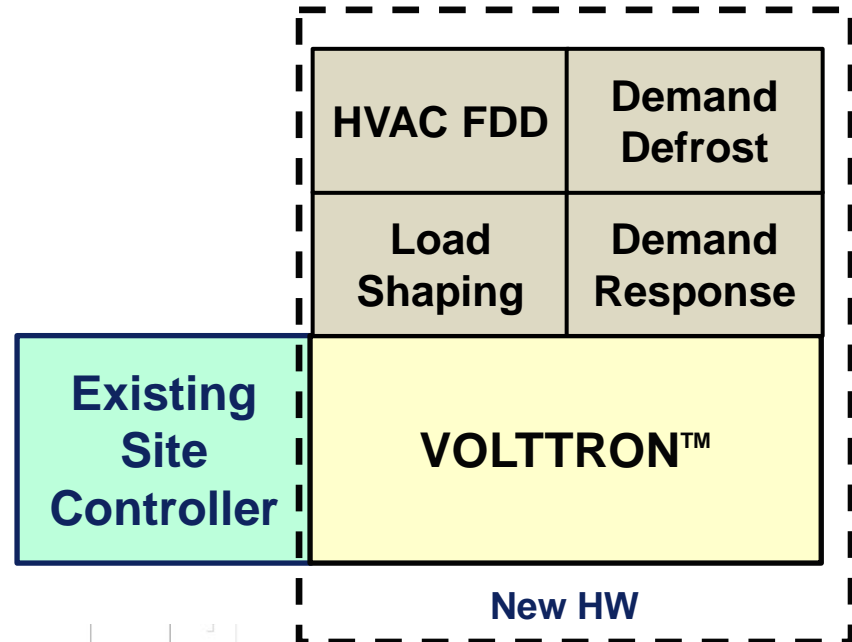
Options To Address Installed Base

Update Site Controller Software
With New Applications



- Consistent Interface
- No New Hardware
- No "Site Visit"
- Apps Must Be Integrated

Install New HW On Site With
Platform & Apps



- Self Contained Application
- Low Risk
- New HW/Site Visit

