

LOOKING FOR HOST SITES

Energy Management

- High Performance Circulator Pump
- Boiler Load Optimization Control
- Turnkey Controls and Analytics
- Real-time Guaranteed Performance
- Cloud-based Interoperable Building Analytics

Plug Loads

- Data-driven Receptacle Control

Water

- Chemical-free Water Treatment

Envelope

- Internal Solar Shade System for Daylight Harvesting & Thermal Control
- Air Barriers: One-step Sprayable Liquid Flashing and Primer-less Self-Adhered Membrane
- Coming in 2017: R-5 Windows, Cold Climate Heat Pumps and Alternative Refrigerants



Energy Efficiency &
Renewable Energy

HIGH PERFORMANCE CIRCULATOR PUMPS

Energy Management Platform

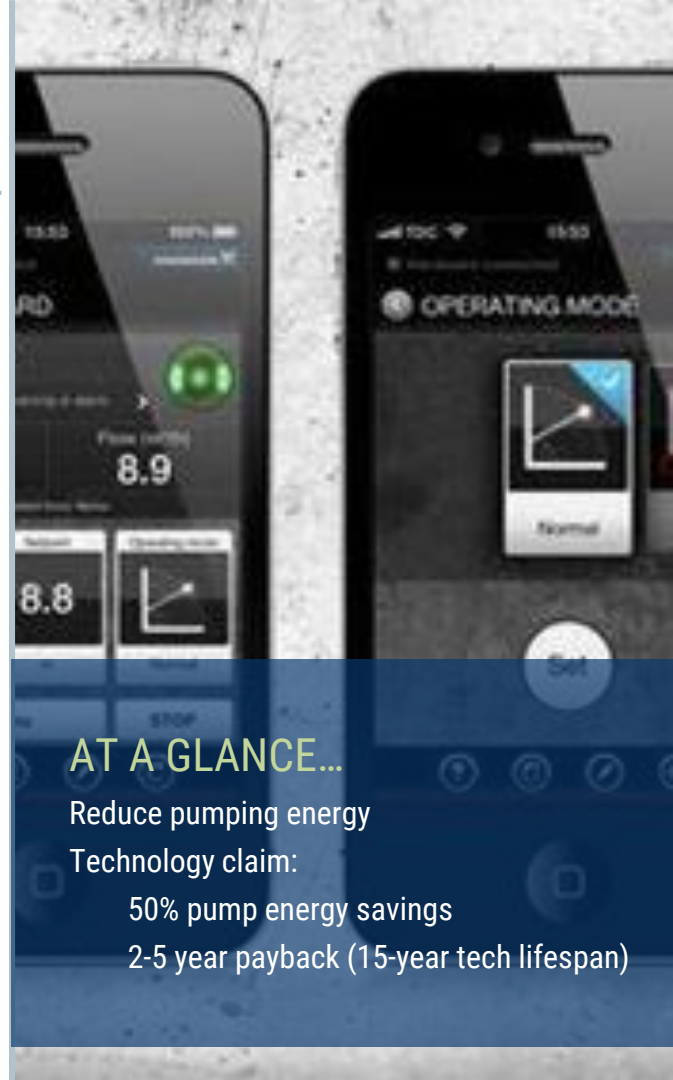
- Convert constant volume pumps to VFDs
- Auto control features
- Built-in metering and reporting via building automation system (BAS) or mobile device

Value of Study

- Validate pump energy savings
- Assess onboard metering value

Value to Owners and Operators

- Optimize building management
- Eliminate wasted pump energy



AT A GLANCE...

Reduce pumping energy

Technology claim:

50% pump energy savings

2-5 year payback (15-year tech lifespan)

HIGH PERFORMANCE CIRCULATOR PUMPS

Site Requirements

Presence of a circulator pump serving space heating/cooling application or domestic hot water application (pump size less than 2.5HP).*

Presence of a BAS such as BACnet, LON, Profibus or GENIBus (pump will need to be hard wired into the network). *

Flow rate of existing circulator pump (heating/cooling) should be less than 150 GPM and total dynamic head should be less than 40 ft. Water temperature should be between 14°F - 230°F. *

Presence of varying load in the domestic hot water, heating or cooling system.*

Good documentation of:

- HVAC operational schedules and control settings (setpoints, sequence of operations of pumps and associated systems)
- major variances from default building system schedules (overrides, system repair downtime, etc.)
- current building HVAC system (up to date mechanical drawings, nameplate data, etc.) *



BOILER LOAD OPTIMIZATION CONTROL

Boiler Efficiency Control

- Reduce standby losses
- Simplify retrofit installation

Value of Study

- Validate fuel savings
- Verify ease of installation

Value to Owners and Operators

- Reduce natural gas usage
- Better boiler control, reduces waste



AT A GLANCE...

Optimizes heating fuel consumption

Technology claim:

10-15% fuel savings

< 2 year payback

BOILER LOAD OPTIMIZATION CONTROL

Site Requirements

Hydronic heating system with liquid water. (that's it!)



CHEMICAL-FREE WATER TREATMENT

Non-Chemical Water Treatment

- Eliminate scale formation and corrosion
- Eliminate the need for added chemicals
- Remove heavy metals

Value of Study

- Validate water and HVAC savings
- Validate maintenance reduction

Value to Owners and Operators

- Reduce water and energy consumption
- Reduce sewer charges
- Reduce use of chemicals



AT A GLANCE...

Addresses water treatment and consumption

Technology claim:

25-80% water savings

10-50% HVAC savings

< 2 year payback

CHEMICAL-FREE WATER TREATMENT

Site Requirements

Cooler tower with existing chemical water treatment (COC range of 3 to 6). *

Well maintained and operated cooling water system. *

Existing meters for make-up and blow down water. *

Existing energy meters on chillers. *

Maintenance records for the cooling water system including chemical and labor costs. *



DUAL ZONE SOLAR CONTROL SHADE

Solar Shade for Light Harvesting

- Independently operated upper and lower shades
- Maximize light while blocking glare

Value of Study

- Validate energy savings
- Assess occupant satisfaction

Value to Owners and Operators

- Potential increase in daylighting in existing buildings
- Energy reduction & improved work environment

AT A GLANCE...

Retrofit application to reduce thermal loads
and optimize daylight

Technology claim:

20-60% lighting savings

14-17% energy compared to roller shades

< 5 year payback



DUAL ZONE SOLAR CONTROL SHADE

Site Requirements

SYSTEM	CHARACTERISTIC
Facility	>50,000 sq. feet and 3 similar floors to test shading technologies and provide a control *
Facade Orientation	South, east, west *
Exterior Obstructions	Windows with unobstructed access to direct sunlight for the majority of the year. Minimal to no exterior attachments such as overhangs, fins, balconies, or adjacent building wings. *
Windows	Head height $\geq 9'$ above finished floor (AFF). Window to wall ratio $> 40\%$. Width: $\leq 8'$ Existing glass: Double pane Low-E * Glass visible transmittance: ≥ 0.40 preferred
Office Configuration	Open plan office adjacent to windows with depth ≥ 20 -30 feet, partitions no higher than 48", no major light obstructions (e.g., columns). *
Occupancy	≥ 30 occupants per space for each type of dual-zone shade, with consistent occupancy. *
Ceiling/wall	White, matte surfaces with equal or better than standard GSA-required reflectance (80% for ceilings, 50% for walls). *
Lighting Control	Automatic continuous daylighting controls ideal. Manual on-off or bi-level lighting controls in private offices are acceptable. LED 0-10v *



Easy to Install Air Barriers

One-Step Sprayable Flashing and Primer-less Self-Adhered Membranes

- Improve airtightness
- Accelerate installation for new and existing construction

Value of Study

- Validate energy savings due to improvement in airtightness and insulation
- Assess occupant satisfaction
- Evaluate ease of installation in retrofit or new applications

Value to Owners and Operators

- Potential to improve occupant comfort
- Energy evaluation including blower door testing and energy simulation
- Validate cost



AT A GLANCE...

Cost-effective envelope application

Technology claim:

2-4 times faster installation

Adherence to many material types

Conformity to most shapes

Easy to Install Air Barriers

Site Requirements

Near term new construction or planned façade retrofit projects.

30,000 sq. ft. or greater

Will need access to the architectural drawings, and to the building before construction, as well as pre-occupation, to run a blower door test.



DATA-DRIVEN RECEPTACLE CONTROL

Cloud-Based Data and User-interface for Plug Load Control

- Intelligent sockets capture and control device energy
- Gateway communicates energy data to cloud network
- User interface enables trending for management of devices

Value of Study

- Assess occupant satisfaction
- Understand connectivity and security

Value to Owners and Operators

- Better data and control for plug and miscellaneous loads
- Ease of installation
- Energy reduction of appliances



AT A GLANCE...

Better data on miscellaneous loads; energy reduction of plug loads

Technology claim:

40% savings for controlled plugs

2-4 year payback



DATA-DRIVEN RECEPTACLE CONTROL

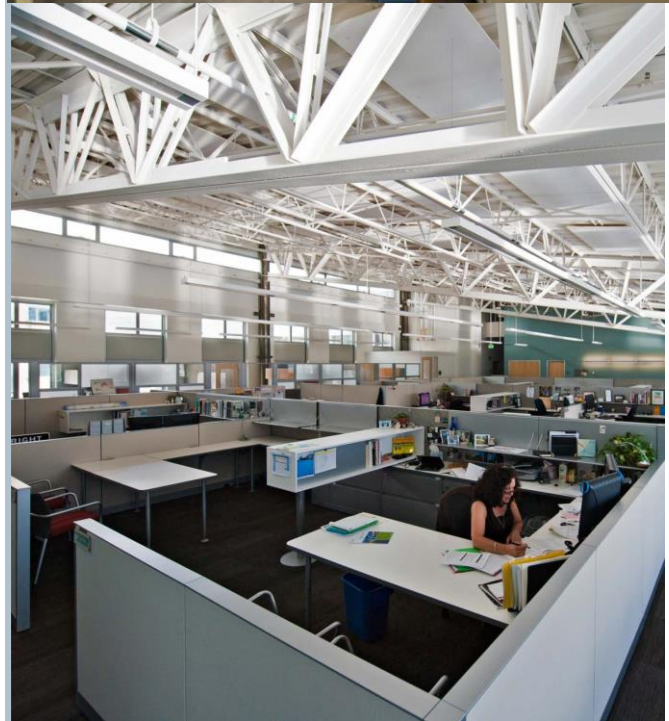
Site Requirements

Considerations for commercial building types: Office, multi-tenant office, retail, higher education, hospitality, or other building type with documentation of significant plug loads.

Building owner must be open to introducing a new wireless network and connectivity through Ethernet cable, or access to cell service for data transmission.

Building owner and tenants must be open to a multi-month (3-6 months) demonstration time.

Access to on-site building manager and a staff representative that can act as a liaison between demonstration leads and building occupants or tenants.



GUARANTEED PERFORMANCE FOR ANALYTICS-BASED ENERGY SAVINGS

Guaranteed Performance through Real-time Remote Control

- Human and digital evaluation and management
- Cloud-based, remote control
- Ongoing management of performance to meet guarantee

Value of Study

- Validate energy savings, commissioning and cost
- Assess applicability of business model
- Understand connectivity and security

Value to Owners and Operators

- Guaranteed performance
- Real-time performance data



AT A GLANCE...

Real-time guaranteed performance with human evaluation, management and analytics

Technology claim:

15% guaranteed savings

2 year payback



GUARANTEED PERFORMANCE FOR ANALYTICS-BASED ENERGY SAVINGS

Site Requirements

Floor area is >100,000 ft²

Presence of a remotely accessible Building Automation System (BAS) addressable with BACnet protocol. The preferred BAS makes and models include Tridium, Siemens.

Mechanical systems with a central plant (chillers and boilers) or large package rooftop unit (>60 ton cooling capacity).

Monthly whole building gas use, electric use, and peak demand

Building or regional-level point of contact with willingness and knowledge to provide evaluation information regarding occupant/tenant and energy management impacts, and utility tariff information .

Cooperative on-site O&M technical team.



TURNKEY CONTROLS AND ANALYTICS

Energy Management for Portfolios of Small Buildings

- Turnkey installation and service
- Cloud-based portfolio trending and analytics
- User-interface for visualization and evaluation of data

Value of Study

- Validate energy savings, commissioning and cost
- Assess ease of use
- Understand connectivity and security

Value to Owners and Operators

- Better data on building operations and control for building performance
- Hands-off, service-based approach



AT A GLANCE...

Better data on cost, energy savings, ease of use, applications and security

Technology claim:

8-35% savings

ROI = 24 months

TURNKEY CONTROLS AND ANALYTICS

Site Requirements

A portfolio with four to six small to mid-size facilities available for the demo.

Floor area is less than 100,000 ft² for each facility.

No pre-existing building automation system.

HVAC systems with package rooftop units.

Existing HVAC systems are in good working condition.

Monthly whole building gas use, electric use, and peak demand.

Building or portfolio-level point of contact with willingness and knowledge to provide evaluation information regarding occupant/tenant and energy management impacts, and utility tariff information



CLOUD-BASED, INTEROPERABLE BUILDING ANALYTICS

Energy Management for Portfolios of Large Buildings

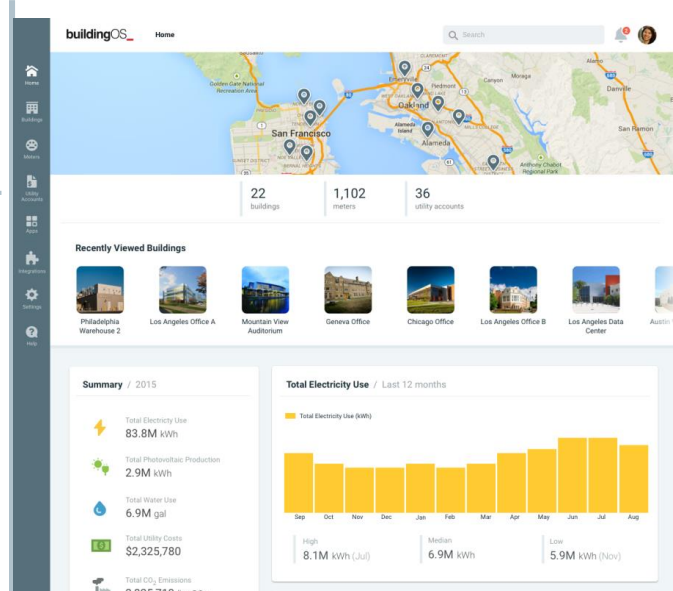
- Ease of data integration across different aspects of building operation
- Platform for data centralization, benchmarking, utility bill monitoring and analysis, efficiency measure verification

Value of Study

- Validate energy savings, commissioning and cost
- Assess ease of use and data integration
- Understand connectivity and security

Value to Owners and Operators

- Improved human resource efficiency: automated benchmarking, disclosure, bill verification analysis, reporting and budgeting
- Improved facility management staff satisfaction: reduced cost to manage and manipulate data, streamlining of energy management
- Tenant Insights



AT A GLANCE...

Centralized data and analytics for better building performance

Technology claim:

10-25% whole building savings

Simple Payback = 12 months

CLOUD-BASED, INTEROPERABLE BUILDING ANALYTICS

Site Requirements

A portfolio with 4 to 6 large commercial building available for the demo.

Floor area is more than 50,000 ft² for each building.

Presence of building automation system.

Monthly whole building gas use, electric use, and peak demand.

Presence of interval whole-building metering.

Building or portfolio-level point of contact with willingness and knowledge to provide evaluation information regarding occupant/tenant, energy management impacts, and utility tariff information .

