



ATMOSPHERES®

Energy Savings Case Studies: Education

BOSS Controls provides Advanced Plug Load Control for Schools & Universities

Hundreds of small plug loads are often not included in campus energy management strategies.

Facilities managers have a tall task when it comes to managing the large numbers of plug-in electronics and appliances spread out across schools and universities. Water fountains, vending machines, computers, window HVACs, electric heaters and many other types of plug loads typically consume, as a combined system, more than 20% of total campus electricity. Controlling these loads as a single system has previously been nearly impossible. Hundreds of plug loads dispersed throughout different buildings, floors and spaces create the incredibly difficult task of physically managing each plug.

Long vacant periods with dynamic operating hours make plug load conservation challenging.

With dynamic occupancy periods, large properties, and busy facilities managers, managing plug loads with simple timers is impractical. Most plug loads are left on continuously, or managed by individual users randomly. Treating these plugs as a single system, where schedules can be broadcast to large groups of plugs in an instant, and where energy consumption can be tracked by device, floor, or building, is essential to any property energy management strategy. Many plug loads, such as window HVACs and personal space heaters can consume a very high portion of total building energy, particularly in older buildings without central HVAC systems.

Realized & Baseline Energy Savings

Installs

BOSS Controls and its partners installed more than four hundred smart plug controllers at three education facilities in contrasting climates, to include campus style universities with multiple distributed buildings, and K-12 schools where buildings operate with contrasting peak times.

Method

Facilities were initially surveyed for plug load peak and average power consumption, as well as facilities operating hours and operational profiles. High energy consuming devices were mainly targeted, but a variety of smaller electronic devices were also included to gather information on a range of plug loads. A baseline (“uncontrolled”) period was compared to a mirrored “scheduled” period, and results were compared. Estimates were adjusted for typically expected manual energy management.

Results: Savings were achieved in three basic ways:



Shutting off equipment during “unoccupied” hours

BOSS controllers completely shut down equipment. This controls both vampire loads and equipment running during “unoccupied” hours - overnight, weekends, holidays.



Responding to dynamic scheduling and occupancies

Staff have the power of remotely scheduling and controlling plugs in any building, from anywhere, even from their home.



Understanding when and how individual devices and groups of devices are consuming energy is powerful information

Staff can not only adjust schedules based on real operational data, but can prioritize equipment for control, service, or replacement.

Public School System #1

Utility Incentive

\$30

Electrical Cost per kWh \$0.095
kg/CO2 per kWh 0.03

Base Period Start 9/25/15
Base Period End 10/29/15
Test Period Start 2/15/16
Test Period End 3/20/16

Test Period

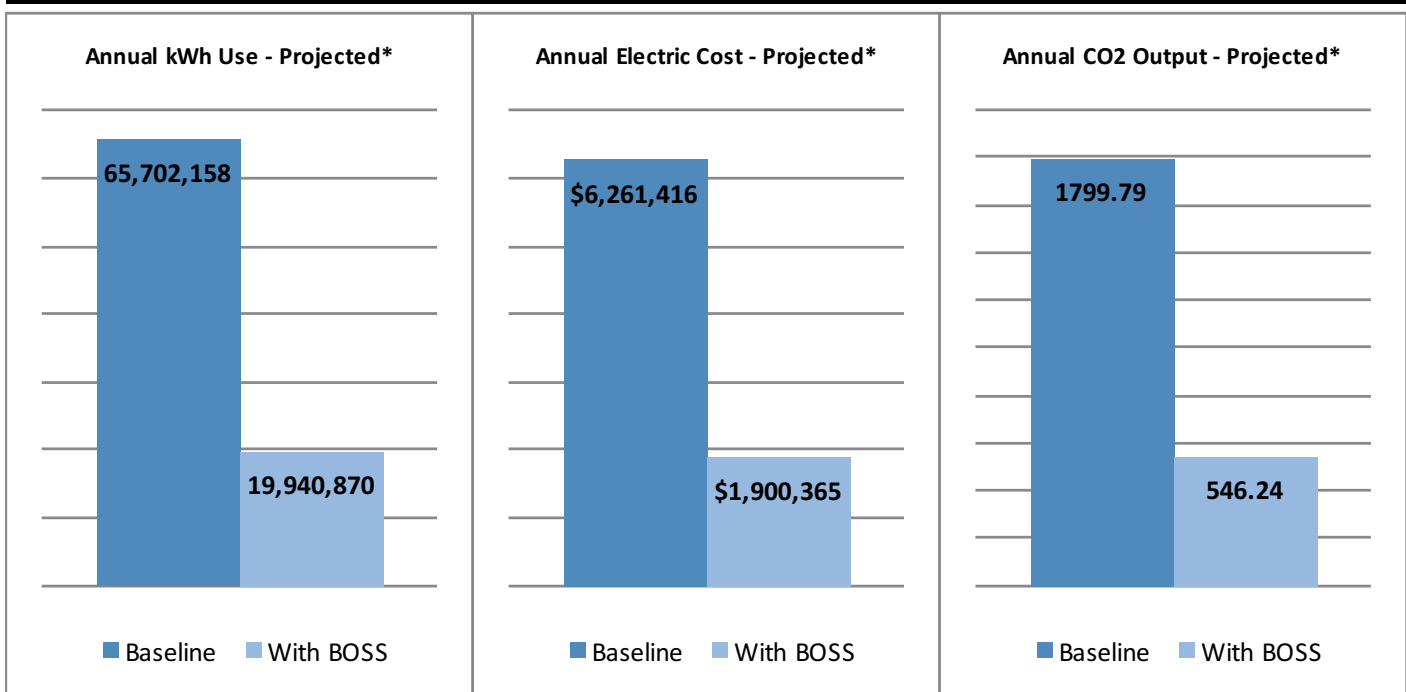
170 110V Plugs
0 220V Plugs
2 Buildings

Full Deployment

111,600 110V Plugs
0 220V Plugs
372 Buildings

	Electricity Used (kWh)	Electricity Cost (\$)	CO2 (Metric Tons)
Actual Base Period without BOSS:	9,597.09	\$914.60	0.26
Actual Test Period with BOSS:	2,912.76	\$277.59	0.08
Savings:	6,684.33	\$637.02	0.18
Annual Projection* - without BOSS:	65,702,158	\$6,261,416	1799.79
Annual Projection* - with BOSS:	19,940,870	\$1,900,365	546.24
Savings:	45,761,288	\$4,361,051	1,253.54

Projected Payback Period: 21 Months



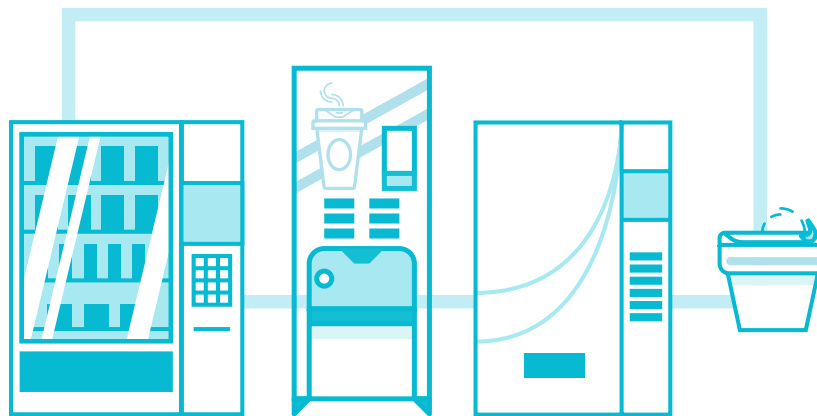
*Projections are based on a scaled 365 day estimate of 111,600 plugs across 372 building(s).

Smart Buildings Start Here.

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Valuable Takeaways

1. As expected, refrigeration and equipment with heating elements offer substantial ROI. PTACs, Window ACs, electric heaters, and plug-in refrigeration equipment (chilled vending machines, ice machines, high-use water fountains) are primary targets for control.



2. Customer electric rates are in the “low average” for commercial properties in the US, so most locations with similar equipment and use will save from 150% to 300%+ of estimated savings at this site. Northeast kWh rates range from \$0.135 per kWh to \$0.21, Florida and Texas rates range from \$0.085 to \$0.125, Midwest properties range from \$0.07 to \$0.14. California ranges from \$0.13 to \$0.26. Southeast properties range from \$0.065 to \$0.115.

Note:

Due to the difficulty of manually managing mechanical or non-networked plug load timers, manual plug timers are rarely used in commercial buildings.

Exert Total Domination.

Computers. Water fountains.
Vending machines. Copiers.
Every workplace has its energy suckers. It's time to take control of yours, on one end-to-end system, at the touch of a finger.

Cloud-Hosted

BOSS Controls begins with the 120V or 220V Smart Plugs. Powered by Atmospheres™, our own cloud software platform, you can now group and control your plug loads from anywhere.

Energy Saving

Control energy usage even when you're not onsite. Vacant apartments, empty meeting rooms, classrooms and offices are no longer energy vampires.

Fast ROI

Electric rates and climate vary greatly from region to region, so managing the heavier plug loads in your facilities delivers the fastest ROI. Rein in your highest-usage devices and start seeing payback in just a few months.

Real-Time Monitoring

Built in measurement and verification — view power usage and analyze savings on the go with up to a year of stored data, segmented by individual device or device group.

