SCHELLER CARBON SAVERS

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PROBLEM STATEMENT

» Over the past 3 years, Scheller has switched its HVAC system to efficient variable-air units and is systematically replacing compact fluorescent bulbs with LEDs. Therefore, **plug load remains one of the greatest opportunities for energy reductions at Scheller**.

» In standard, un-renovated office buildings, plug loads typically account for 25% of the total electrical load; however, in more efficient office buildings that have renovated HVAC and electrical systems, **plug loads can account for more than 50% of the total electrical load.** Furthermore, plug loads are expected to increase in both proportion of energy use and actual energy use, as office equipment energy consumption is expected to rise at a rate of 0.8% per year.

WHAT IS A PROGRAMMABLE SMART STRIP?

» Programmable smart strips are typically advanced surge protectors with various features to reduce energy consumption during idle times.

THE PLAN

» Installing programmable smart strips in **key areas such as computer labs, offices, lounges, and classrooms** offer the most opportunity for energy savings and ROI with the least amount of disruption to occupants.

CO2 REDUCTIONS

» Scheller's total electricity - 2017 (4,019,852.1 kWh)
» Carbon impact per kWh: avg. 4.3 lbs CO2/kWh in Georgia

2016 Data from U.S. Energy Information Administration

Average Annual Scheller consumption x 25% consumption from plug load x 15% reduction from implementation x carbon impact =
» **92,221.668 lbs C02**

Approximate to 4.2 2018 Ford Fusions taken off the road per year!

MONEY SAVED

» Scheller spends an average of $.054/kWh (2016-2017 data)
» Annual savings of 73,542 kWh = **$3,971/year in savings**
» 250 smart strips @ $27.93 = $6,982.50 initial cost (Belkin CNS08-T-06)
» Scheller staff to install (no additional cost)
» Payback Period = 1.75 years (20 months 4 weeks 1 day)
» ROI = (-43%) after 1 year, 14% after 2 years, 71% after 3 years
» **NPV = $10,392.32** (over 5 years w/ 4.75% prime rate)

CO-BENEFITS

- **Energy reductions**
- **Carbon Reduction**
- **Increased workplace flexibility**
- **Improved IT update process**
- **Work Green certification**
- **Lower operating expenses**
- **Optimization of power outlets**
- **Power management automation**
- **Marketability**
- **Case study for future projects**

STATUS & FUTURE PLANS

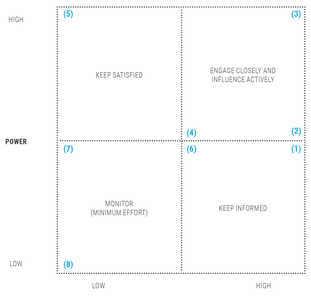
» The Ray C. Anderson Center has championed a Work Green Committee to initiate the implementation of several sustainable strategies at Scheller, which includes an initiative for the proposed smart strips. A pilot study is has been discussed with Scheller Facilities and is awaiting final approval.

One of team members, William Callahan, has been selected for this committee and will continue to monitor progress and the ongoing development of the project.

SCALABILITY

» **ACROSS CAMPUS** There are currently **13 other departments on Georgia Tech's Campus** striving for Work Green Certification.
» **ATLANTA** Within the city, there are **+350 LEED certified buildings** serving as ideal candidates for smart strip upgrades.
» **STATE** Within the state, there are **+719 LEED certified buildings** serving as idea candidates for smart strip upgrades.
» **NATIONWIDE** Across the US, plug loads account for **5% of primary energy consumption**.[5]

SOURCES
[1] Lobato, C.; Pless, S.; Sheppy, M., "Reducing Plug and Process Loads for a Large Scale, Low Energy Office Building: NREL's Research Support Facility." NREL/CP-5500-49002. Golden, CO: National Renewable Energy Laboratory. Accessed June 28, 2012: http://www.nrel.gov/docs/fy11osti/49002.pdf, 2011.
[2] Gandhi, Priya and Brager, Gail S., "Commercial Occupant Plug Load Energy Consumption Trends and the Role of Occupant Behavior," Energy and Buildings,Vol. 125, August 2016.
[3] Hackel, Scott, Seventhwave, Center for Energy and Environment, LHB, "Impacts of Office Plug Load Reduction Strategies," prepared for Minnesota Department of Commerce Division of Energy Resources, 2016.
[4] https://www2.isye.gatech.edu/~vthomas/reducing_ghg_emissions_atl.pdf
[5]https://www.gsa.gov/about-us/organization/office-of-governmentwide-policy/office-of-federal-highperformance-buildings/research-into-practice-program/plug-load-management-suite/plug-load-frequently-asked-questions-faq



Civil Society Stakeholders
1) Carbon Reduction Challenge
- Beril Toktay, Professor
- Kim Cobb, Professor

2) Ray C. Anderson Center for Sustainable Business
- Michael Oxman, Director
- Arianna Robinson, Program and Operations Manager

3) Scheller Facilities
- David Alberti, Manager

4) Georgia Tech Facilities
- Malte Weiland, Senior Sustainability Project Manager

5) Scheller College of Business
- Maryam Alavi, Dean

6) Work Green Initiative
- Sarah Neville, Campus Sustainability Coordinator

7) Scheller Faculty & Staff
8) Students

Public Sector Stakeholders
N/A

Private Sector Stakeholders
Smart-strip Retailer:
- Staples
- Amazon

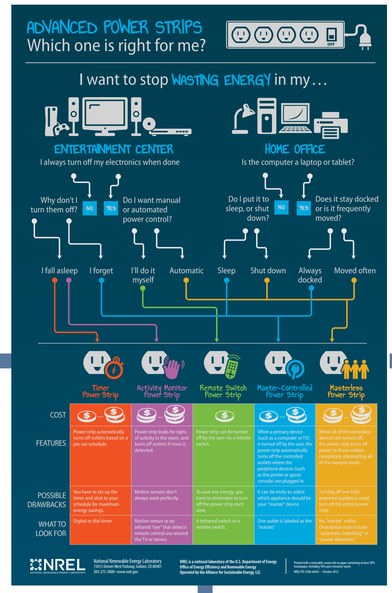
FIGURE 1: STAKEHOLDER MAPPING

BENEFIT v / STAKEHOLDER >	Scheller Facilities	ACSB	Carbon Reduction Challenge	Georgia Tech Facilities	Scheller College of Business	Work Green Initiative	Scheller Faculty & Staff	Students
Energy reduction	■	■	■	■		■		
Lower operating expense	■			■	■			
Carbon reduction	■	■	■					
Maximization of outlet space	■	■					■	■
Workspace flexibility	■	■			■		■	■
Power-management automation (less individual responsibility)	■	■		■	■			
More routine software updates (required shutdown)	■	■			■		■	
Marketability of sustainable improvement	■	■	■	■	■	■	■	■

FIGURE 3: BENEFIT REALIZATION

STAKEHOLDER	STAKE IN PROJECT	WHAT DO WE NEED FROM THEM?	PERCEIVED ATTITUDES/ RISKS	RISK IF THEY ARE NOT ENGAGED
Scheller Facilities	Will own and maintain the smart-strips	Commitment to implementing project	Interest in overall impact of multi-pronged improvement approach	Project would not be implemented
ACSB	Facilitating the Work Green certification of Scheller & documentation of smart-strip credit	Contribute to recommended project	Very supportive. Smart-strips included in Work Green recommendations	Duplicated efforts could diminish efficiency of stakeholder engagement
Carbon Reduction Challenge	Associated with quality and effectiveness of project delivery	Continuous feedback and support	Interested in larger carbon reductions	Expectations could vary from scope of project
Georgia Tech Facilities	Will evaluate the project for implementation across campus	Information regarding similar on-campus projects & energy management data	Very supportive and interested in follow-on projects	Could delay other similar on-campus projects & lack of data support
Scheller College of Business	Responsible for budgetary management of funds necessary for project	If funding exceeds allocated budget, Dean approval	Lack of interest unless necessary funding exceeds budget	Additional necessary funding could not be available
Work Green Initiative	Tracks campus sustainability initiatives and offers grants	Certification and possible funding	Interest in gaining another on-campus Work Green organization	Could fail to meet criteria for certification and available grants
Scheller Faculty & Staff	Will utilize hardware	User acceptance	Lack of interest due to minimal disruption	Smart-strips could be bypassed & energy reductions could be diminished
Students	Will utilize hardware	User acceptance	Lack of interest due to minimal disruption	Smart-strips could be bypassed & energy reductions could be diminished

FIGURE 2: STAKEHOLDER ANALYSIS



Faculty and students need only power on the smart strip by:
1. Press the switch at desk level.
2. Turn on computer or appliances as needed.
3. The surge protector will automatically turn off after the programmed idle time. (default 11 hours)

Belkin CNS08-T-06 Programmable Smart Strip (below) with Manual Switch (above)

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Recyclable

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