

**Project Submittal
for
Sustainability Committee Loan
Funding:**

**Illini Union
Lighting Occupancy Sensors**

Date: 4/1/10

Prepared by: David C. Guth



APPLICATION INFORMATION

Project Lead Contact Information

Name: Jim Clark
E-mail: jclark76@illinois.edu
Phone: 333-3954
Title: Facilities Operations Manager
Organization/Department:
Illini Union/Facilities Maintenance &
Operations

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Illini Union, MC-384
1401 W. Green Street
Urbana, IL 61801

Secondary Contact Information

Name: David Guth
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Title: Assistant to the Director
Organization/Department:
Illini Union/Facility Maintenance &
Operations

Address:
Illini Union, MC-384
1401 W. Green Street
Urbana, IL 61801

Unit Financial Officer Contact Information:

Name: Scott McCartney
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Organization/Department:
Illini Union/Business Affairs

Address:
Illini Union, MC-384
1401 W. Green Street
Urbana, IL 61801



Detailed Project Description

I. Project Goals

- **Primary Goals:**

1. **Reduce lighting electricity consumption within the Illini Union** by installing Hubbell, Intermatic (or equivalent) dual-technology lighting sensors throughout the facility in restrooms, offices, storage areas, and meeting rooms. These sensors will automatically switch off the lights in these areas, after fifteen (15) minutes of inactivity. This project will serve to increase the energy efficiency:
 - a. Implementing light sensors will reduce negative impacts to the environment by limiting and enhancing the use of energy, space, and materials. By installing these sensors we reduce lighting consumption by approximately 13 – 90%, depending on the areas installed.
 - b. The sensors should last ten (10) years, depending on location and use.
 - c. Sensors will be located in all restrooms, meeting rooms on the second and third floors, kitchen areas, and offices on the second and third floors.
 - d. University of California at Los Angeles has installed Hubbell light sensors with a clear savings: <http://www.hubbell-.com/press/pdfs/UCLA.pdf>
2. **Raise awareness and educate students** on the impact lighting conservation has on energy conservation and the potential environmental and economic savings resulting from it. This will be accomplished through The Illini Union Marketing Department communicating the project progress and outcomes to the approximately 15,000 visitors per day on the “*Under GREENstruction*” signs outside of the rooms while the sensors are being installed. We will also provide information regarding the Sustainability Committee on our website and digital signage.

- **Defining Sustainability & Project Impacts**

1. **Definition:** In defining what we mean by sustainability at the campus level, we need to have a common understanding of “sustainability”. The broad definition adopted by Student Affairs was stated in the 1987 report of the UN Commission on Environment and Development, Our Common Future: “**sustainable development**” (i.e., **sustainability**) is defined as “**development that meets the needs of the present without compromising the ability of future generations to meet their own needs.**” This definition supports providing long term (generational) solutions within a framework where the needs for all life on our planet are considered. In the industrial age, a collective mindset tended to separate the impact of the larger society and its economic impact on the environment. In fact, sustainability recognizes the connection and interdependence between living (including non-human life), environmental and economic systems. Sustainability recognizes the potential impacts and consequences between these interconnected systems.



2. **Impacts:** The project connects these three spheres by intelligently controlling the light levels to maintain a safe and functional building environment for Illini Union customers and staff. This energy usage reduction translates into tangible economic cost and environmental impact savings. By communicating the results to stakeholders, a change in consciousness may occur, tying behavior to wider benefits to the university community and wider world.

• **Feasibility**

1. **Electrical Evaluation:** The Illini Union facilities staff has worked closely with F&S Engineers to develop a number of projects that would significantly impact sustainability. One such project that was highly recommended by the F&S staff involves the installation of occupancy sensors to control lighting in various areas throughout the facility. This project has already been scoped by F&S in four components, as follows:

- Install lighting occupancy sensors in Food Service Preparation areas
- Install lighting occupancy sensors in Restrooms
- Install lighting occupancy sensors in Office areas
- Install lighting occupancy sensors in Meeting Rooms

Each room was individually evaluated for usage, sensor type and electrical tie-in requirements. A schedule of rooms/sensor types is attached.

- **Estimated Project Longevity/Results on Campus:** Average estimated sensor life = ten (10) years, depending on usage.

II. Budget & Fundraising:

• **Detailed Budget:**

1. Construction cost estimates from F&S include installation, cover plates, labor and construction supervision:

| | |
|--|-----------------------|
| Install lighting occupancy sensors in Food Service preparation areas | \$28,463 |
| Install lighting occupancy sensors in Restrooms | \$18,216 |
| Install lighting occupancy sensors in Office areas | \$13,093 |
| Install lighting occupancy sensors in Meeting Rooms | <u>\$6,148</u> |
| Total Estimated Base Cost (for all four components) | \$65,919 |
| Project Contingency (2%) | <u>\$1,319</u> |
| Total Project Cost with 2% Contingency | \$67,238 |



- **Funding:**
 1. Illini Union will apply for an interest free loan to cover the total cost of the project.
 2. Once the project is complete, a submittal to the Office of Sustainability (Tom Abram) will be made to apply for Federal grant reimbursement, estimated at **99.5 kW of controlled watts for an incentive of around \$12,500 in FY11.**
 3. This project will not move forward in the current fiscal year without loan funding from the Sustainability Committee.

- **Return:**
 1. **Straight-line Payback Analysis:** \$67,238 Project Cost/\$9,620 Annual Savings = **7 years**, assuming 130,700 Kilowatt Hours in reduced annual electrical usage and not deducting Federal grant reimbursement from the project cost
 2. The resulting reduction in greenhouse gas emissions would further total approximately **218,530 pounds of carbon** dioxide annually.

III. Timeline

- The installation of the sensors can occur almost immediately after funding has been acquired. It is estimated that it would take 90 days to complete this project.

IV. Energy, Environmental, Social and Economic Impact

A. Renewable Energy Projects – N/A

B. Energy Efficiency Projects

- As the cost of energy increases significantly, the Illini Union has done significant planning for the future in terms of infrastructure upgrades to reduce energy costs. This project should save \$9,620 annually. **The project should reduce kilowatt consumption by 130,700 kWh/year*.**
- Over the life of the project (10 years), the lighting occupancy sensors should **save \$96,699 or 1,306,693 kWh.**
- We do not anticipate significant energy inputs to execute and maintain the project.

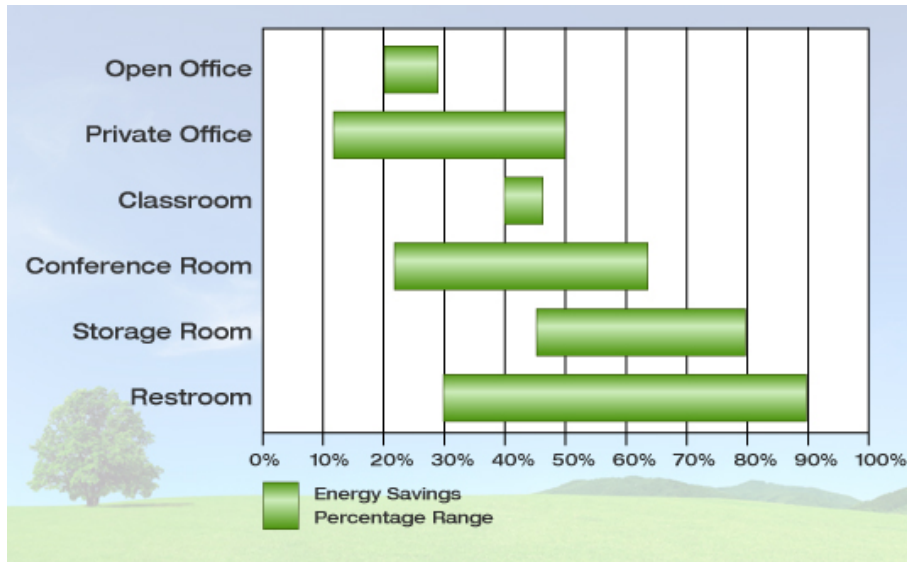
* *Estimate confirmed by F&S Engineering*

C. Environmental Impact/Social Impact/Economic Impact

- **Environmental Impact**
218,530 lbs CO₂ emissions reduction (based on 1.672 CO₂ lb/kWh): all efforts will be made to recycle old fixtures.
- **Social Impact**
 By installing lighting sensors and marketing the results to the University, students can become more aware on a daily basis of the impact lighting controls can have on energy reduction and the resulting cost savings.
- **Economic Impact**
 By saving money on energy costs, the Illini Union will be able to use this money for other purposes and continue to provide more benefit to the student body that use this building. Total energy savings used for lighting can accumulate to around 40-50%



(see illustration below). Additionally, maintenance requirements can be reduced with good lighting controls and their time can be better spent elsewhere.



V. Outreach and Education

- The Illini Union promotes their green projects and the Student Sustainability Committee.
- Hundreds of students that pass through the Illini Union daily will experience the sensors.
- Students will be able to understand the importance of using energy efficiently by turning off lights.
- This affords an opportunity for students to learn about ways to conserve energy in their daily activities and lives.
- Additional education on the project savings and information marketing the Sustainability Committee on the 'under construction' signs outside of the rooms during construction.
- We will also provide information regarding the Sustainability Committee on our website to promote the Committee.
- Providing this information will allow the many students that pass through our building and visit our website to learn about the Sustainability Committee and its importance to our building and campus.

| Room | Qty | Room Used as... | Control Type | Model # | Accessory Remarks | Comments | Quantity | |
|-------|-----|--|--------------|---------------------|---------------------------------|---|--|----|
| 0006D | 1 | Food Facilities Service wall | | AD127711 | | | | |
| 10 | 2 | Food Facilities Service ceiling | | (2) ATD2000C CU120A | Plaster clg, wiremold | General note: All devices from Hubbell, InterMatic (or equal) except where noted. Dual-technology sensors to be installed and set for 15 minute time-to-off. | | |
| 11 | 2 | Food Facilities Service ceiling | | (2) ATD2000C CU120A | Plaster clg, wiremold | | Group 1 - Restrooms | 18 |
| 0011A | 1 | Food Facilities Service wall | | AD127711 | | | Group 2 - Meeting Rooms | 29 |
| 12 | 1 | Food Facilities Service wall | | AD127711 | | | Group 3A - Food Service (Cold Storage) | 12 |
| 13 | 1 | Food Facilities Service wall | | AD127711 | | Group 3B - Food Service (Kitchens & Serving Areas) | 21 | |
| 17 | 1 | Circulation Area Inter-Matic | | FF60MC | Cooler | Group 4 - Offices | 83 | |
| 18 | 1 | Food Facilities Service Inter-Matic | | FF60MC | Cooler | TOTAL UNITS | 163 | |
| 19 | 1 | Food Facilities Service Inter-Matic | | FF60MC | Cooler | | | |
| 20 | 1 | Food Facilities Service Inter-Matic | | FF60MC | Cooler | | | |
| 21 | 1 | Food Facilities Service Inter-Matic | | FF60MC | Cooler | | | |
| 24 | 1 | Food Facilities Service ceiling | | ATD2000C CU120A | Kitchen, work above plaster clg | | | |
| 0025B | 1 | Unit Storage wall | | AD127712 | | | | |
| 0026D | 1 | Food Facilities Service Inter-Matic | | FF60MC | Cooler | | | |
| 28 | 2 | Food Facilities Service ceiling | | (2) ATD2000C CU120A | Kitchen, work above plaster clg | | | |
| 29 | 1 | Food Facilities Service Inter-Matic | | FF60MC | Cooler | | | |
| 30 | 1 | Food Facilities Service Inter-Matic | | FF60MC | Cooler | | | |
| 31 | 1 | Food Facilities Service Inter-Matic | | FF60MC | Cooler | | | |
| 32 | 1 | Food Facilities Service Inter-Matic | | FF60MC | Cooler | | | |
| 34 | 1 | Food Facilities Service Inter-Matic | | FF60MC | Cooler | | | |
| 35 | 1 | Food Facilities Service Inter-Matic | | FF60MC | Cooler | | | |

| | | | | | |
|-------|---|------------------------------------|--------------|--------|----------------------------------|
| 0035A | 1 | Mechanical Area wall | AD127711 | | Women's |
| 0035B | 1 | Custodial Area ceiling | ATD2000C | CU120A | Women's - plaster clg, wiremold |
| 0037A | 1 | Custodial Area wall | AD127711 | | Men's |
| 0037B | 1 | Custodial Area ceiling | ATD2000C | CU120A | Men's - plaster clg, wiremold |
| 38 | 2 | Food Facilities Service ceiling | (2) ATD2000C | CU120A | Kitchen, work above plaster clg |
| 40 | 1 | Clinic (Non-Health Prof.) wall | AD127712 | | |
| 0040A | 1 | Clinic (Non-Health Prof.) wall | AD127711 | | |
| 43 | 1 | Clinic (Non-Health Prof.) wall | AD127711 | | |
| 51 | 1 | Class Laboratory wall | AD127712 | | |
| 62 | 2 | Custodial Area ceiling | (2) ATD2000C | CU120A | Men's - plaster clg, wiremold |
| 87 | 2 | Custodial Area ceiling | (2) ATD2000C | CU120A | Women's - plaster clg, wiremold |
| 113 | 1 | Food Facilities Service wall | AD127711 | | Serving Kitchen |
| 0113D | 1 | Food Facilities Service wall | AD127711 | | Serving Kitchen |
| 163 | 1 | Custodial Area ceiling | ATD2000C | CU120A | Women's - work above plaster clg |
| 164 | 1 | Custodial Area ceiling | ATD2000C | CU120A | Men's - work above plaster clg |
| 168 | 2 | Food Facilities Service ceiling | (2) ATD2000C | CU120A | Serving Kitchen |
| 178 | 1 | Custodial Area ceiling | ATD2000C | CU120A | Women's - work above plaster clg |
| 179 | 1 | Custodial Area ceiling | ATD2000C | CU120A | Men's - work above plaster clg |
| 203 | 1 | Food Facilities Service ceiling | (2) ATD2000C | CU120A | Metal Pan ceiling |
| 209 | 1 | Assembly wall | AD127712 | | |
| 211 | 1 | Assembly wall | AD127712 | | |
| 213 | 1 | Assembly wall | AD127711 | | |
| 215 | 1 | Assembly wall | AD127712 | | |
| 217 | 1 | Office | AD127712 | | |
| 219 | 1 | Custodial Area wall | AD127711 | | Men's |
| 0219B | 1 | Custodial Area wall | AD127711 | | Men's |
| 221 | 1 | Office wall | AD127712 | | |
| 0221A | 1 | Office wall | AD127711 | | |
| 222 | 2 | Office ceiling | (2) ATD2000C | CU120A | |
| 0222C | 1 | Office wall | AD127711 | | |
| 0222D | 1 | Conference Room wall | AD127712 | | |
| 0222E | 1 | Office wall | AD127711 | | |
| 0225B | 1 | Office wall | AD127711 | | |
| 226 | 1 | Office Service wall | AD127711 | | |
| 227 | 1 | Office wall | AD127712 | | |
| 229 | 1 | Office wall | AD127711 | | |
| 230 | 1 | Office wall | AD127712 | | |
| 231 | 1 | Office wall | AD127711 | | |
| 232 | 1 | Office wall | AD127711 | | |
| 0232A | 1 | Office wall | AD127711 | | |
| 250 | 1 | Office wall | AD127711 | | |
| 252 | 1 | Conference Room wall | AD127712 | | |
| 254 | 1 | Office wall | AD127711 | | |
| 255 | 1 | Office wall | AD127711 | | |
| 256 | 1 | Office wall | AD127711 | | |

| | | | | | |
|-------|---|----------------------|----------|--------|-------------------------------|
| 257 | 1 | Office wall | AD127711 | | |
| 0257A | 1 | Office wall | AD127711 | | |
| 258 | 1 | Office wall | AD127711 | | |
| 260 | 1 | Office wall | AD127711 | | |
| 262 | 1 | Office wall | AD127711 | | |
| 264 | 1 | Office wall | AD127711 | | |
| 266 | 1 | Office wall | AD127711 | | |
| 268 | 1 | Office wall | AD127711 | | |
| 270 | 1 | Office wall | AD127711 | | |
| 277 | 1 | Conference Room wall | AD127711 | | |
| 284 | 1 | Office wall | AD127712 | | |
| 285 | 1 | Office wall | AD127712 | | |
| 0285A | 1 | Office Service wall | AD127711 | | |
| 0285C | 1 | Office wall | AD127711 | | |
| 0285D | 1 | Office wall | AD127711 | | |
| 0285E | 1 | Office wall | AD127711 | | |
| 0285F | 1 | Office wall | AD127711 | | |
| 0285G | 1 | Office wall | AD127711 | | |
| 0285H | 1 | Office wall | AD127711 | | |
| 286 | 1 | Assembly wall | AD127712 | | |
| 287 | 1 | Office wall | AD127711 | | |
| 288 | 1 | Office wall | AD127711 | | |
| 290 | 1 | Office Service wall | AD127712 | | |
| 291 | 1 | Office wall | AD127711 | | |
| 292 | 1 | Office wall | AD127711 | | |
| 293 | 1 | Office wall | AD127711 | | |
| 294 | 1 | Office wall | AD127711 | | |
| 295 | 1 | Office wall | AD127711 | | |
| 297 | 1 | Office wall | AD127711 | | |
| 298 | 1 | Conference Room wall | AD127712 | | |
| | | Food Facilities | | | |
| 305 | 1 | Service ceiling | ATD2000C | CU120A | wire to exist. 3-way switches |
| | | Food Facilities | | | |
| 0305A | 1 | Service wall | AD127711 | | |
| 319 | 1 | Conference Room wall | AD127711 | | |
| 322 | 1 | Conference Room wall | AD127711 | | |
| 323 | 1 | Office wall | AD127712 | | |
| 0323A | 1 | Office wall | AD127711 | | |
| 0323B | 1 | Office wall | AD127711 | | |
| 324 | 1 | Office wall | AD127711 | | |
| 0324A | 1 | Office wall | AD127711 | | |
| 0324B | 1 | Office wall | AD127711 | | |
| 0324C | 1 | Office wall | AD127711 | | |
| 0324D | 1 | Office wall | AD127711 | | |
| 325 | 1 | Office wall | AD127711 | | |
| 326 | 1 | Office wall | AD127711 | | |
| 0326A | 1 | Office wall | AD127711 | | |
| 328 | 1 | Office wall | AD127711 | | |
| 0328A | 1 | Office wall | AD127711 | | |
| 0328B | 1 | Office wall | AD127711 | | |
| 0328C | 1 | Office wall | AD127711 | | |
| 329 | 1 | Office wall | AD127711 | | |
| 330 | 1 | Office wall | AD127711 | | |

| | | | | |
|--------|---|-------------------------------------|--------------|---|
| 333 | 1 | Office Service wall Central | AD127711 | |
| 335 | 1 | Comp./Telecom wall | AD127711 | |
| 335 | 1 | Custodial Area wall | AD127711 | |
| 0335A | 1 | Office Service wall | AD127711 | |
| 0335B | 1 | Office Service wall | AD127711 | |
| 0335C | 1 | Office Service wall | AD127711 | |
| 0335D | 1 | Office Service wall Meeting Room | AD127711 | |
| 401 | 1 | Service wall | AD127711 | |
| 402 | 1 | Meeting Room wall | AD127712 | |
| 403 | 1 | Meeting Room wall | AD127712 | |
| 404 | 2 | Meeting Room wall | (2) AD127712 | Install and wire as 3-way (check schematic) |
| 405 | 2 | Meeting Room wall | (2) AD127712 | Install and wire as 3-way (check schematic) |
| 406 | 2 | Meeting Room wall | (2) AD127712 | Install and wire as 3-way (check schematic) |
| 407 | 2 | Meeting Room wall | (2) AD127712 | Install and wire as 3-way (check schematic) |
| 408 | 1 | Meeting Room wall | AD127712 | |
| 409 | 1 | Merchandising wall | AD127712 | |
| 410 | 1 | Custodial Area wall | AD127711 | Men's |
| 411 | 1 | Custodial Area wall | AD127711 | Women's |
| 412 | 1 | Custodial Area wall | AD127711 | Women's |
| 413 | 1 | Custodial Area wall | AD127711 | Men's |
| 0420AB | 1 | Office wall | AD127711 | |
| 0420AC | 1 | Office wall | AD127711 | |
| 0420B | 1 | Office wall | AD127711 | |
| 0420C | 1 | Office wall | AD127711 | |
| 0420D | 1 | Office wall | AD127711 | |
| 0420E | 1 | Office wall | AD127711 | |
| 0420G | 1 | Office wall | AD127711 | |
| 0420H | 1 | Conference Room wall | AD127712 | |
| 0420L | 1 | Office Service wall | AD127711 | |
| 0420P | 1 | Office Service ceiling | ATD2000C | CU120A |
| 0420Q | 1 | Office wall | AD127711 | |
| 0420R | 1 | Office wall | AD127711 | |
| 0420S | 1 | Office wall | AD127711 | |
| 0420U | 1 | Office wall | AD127711 | |

Illini Union Light Occupancy Sensor Payback Analysis

| Space Type | Avg. Savings % | Quantity | Electric Rate | | Est. Annual Usage kWh | Est. Annual Savings | Est. Funding | Est. Annual Payback (Years) |
|--|-----------------------|-----------------|----------------------|--|------------------------------|----------------------------|---------------------|------------------------------------|
| Group 1 - Restrooms | 40% | 18 | 0.0736 | | 14,433 | \$1,062 | \$18,216 | |
| Group 2 - Meeting Rooms | 30% | 29 | 0.0736 | | 23,253 | \$1,711 | \$6,148 | |
| Group 3A - Food Service (Cold Storage) | 90% | 12 | 0.0736 | | 9,622 | \$708 | \$10,350 | |
| Group 3B - Food Service (Kitchens & Serving Areas) | 30% | 21 | 0.0736 | | 16,839 | \$1,239 | \$18,113 | |
| Group 4 - Offices | 30% | 83 | 0.0736 | | 66,553 | \$4,898 | \$13,093 | |
| Totals | | 163 | | | 130,700 | \$9,620 | \$65,919 | 6.85 |
| Total Project + Contingency (2%) | | | | | | | \$67,238 | 6.99 |

| Project Life Estimates | Proj. Life (Years) | Proj. Life kWh Savings | Proj. Life Cost Savings |
|-------------------------------|---------------------------|-------------------------------|--------------------------------|
| | 10 | 1,307,000 | \$96,195 |

TIME AND MATERIAL PROPOSAL

DATE: March 16, 2009

To: Jim Clark

Phone: 333-3954 **Fax:** _____

From: Thomas Doud

Phone: 244-3686 **Fax:** 244-5200

Subject: Occupancy sensors for food service areas

Facilities & Services has developed the following general scope and expected cost for your review and approval
 The project ID or Work Order is 4456682A Please, reference it on all correspondence concerning this project.

| No. | ITEM | Expected Cost |
|---|--|----------------------------|
| 1 | This estimate covers installation of occupancy sensors and cover plates in food service areas at the Illini Union. | |
| 2 | The rooms that will receive occupancy sensors are on the list as provided by Eva Sweeny | |
| 3 | This estimate covers materials, labor and supervision. | \$ 27,500.00 |
| Expected Cost (Time & Material, Straight Time) | | \$ 27,500.00 |
| Add for Overtime Work | | \$ - |
| TOTAL EXPECTED COST, TIME & MATERIAL | | \$ <u>27,500.00</u> |

NOTE: This form cannot be altered by the customer or user. Additions or modifications require a revision in the scope of work and the associated expected cost. Altered proposals will be cancelled.

If this general scope of work and expected cost are acceptable, and if you desire the work to be performed on a **TIME & MATERIAL** basis, please provide an account number and this form will serve as authorization to proceed.

Please accept or decline this proposal within 30 days.

Authorization: Accept Decline Revise

If accepted, I agree with the general scope and the expected cost as presented and understand that a detailed scope will be completed prior to commencement of work. I understand this work is being performed on a time & material basis and the actual cost may exceed the expected cost.

Department authorization: _____

Date: _____

CHAMPS Account # _____

BANNER C-FOAPAL: C: _____ F: _____ O: _____ A: _____ P: _____ A: _____ L: _____

TIME AND MATERIAL PROPOSAL

DATE: March 16, 2009

To: Jim Clark

Phone: 333-3954 **Fax:** _____

From: Thomas Doud

Phone: 244-3686 **Fax:** 244-5200

Subject: Occupancy sensors for restroom areas

Facilities & Services has developed the following general scope and expected cost for your review and approval
The project ID or Work Order is 4456682B Please, reference it on all correspondence concerning this project.

| No. | ITEM | Expected Cost |
|---|---|----------------------------|
| 1 | This estimate covers installation of occupancy sensors and cover plates in the restrooms at the Illini Union. | |
| 2 | The rooms that will receive occupancy sensors are on the list as provided by Eva Sweeny | |
| 3 | This estimate covers materials, labor and supervision. | \$ 17,600.00 |
| Expected Cost (Time & Material, Straight Time) | | \$ 17,600.00 |
| Add for Overtime Work | | \$ - |
| TOTAL EXPECTED COST, TIME & MATERIAL | | \$ <u>17,600.00</u> |

NOTE: This form cannot be altered by the customer or user. Additions or modifications require a revision in the scope of work and the associated expected cost. Altered proposals will be cancelled.

If this general scope of work and expected cost are acceptable, and if you desire the work to be performed on a **TIME & MATERIAL** basis, please provide an account number and this form will serve as authorization to proceed.

Please accept or decline this proposal within 30 days.

Authorization: Accept Decline Revise

If accepted, I agree with the general scope and the expected cost as presented and understand that a detailed scope will be completed prior to commencement of work. I understand this work is being performed on a time & material basis and the actual cost may exceed the expected cost.

Department authorization: _____

Date: _____

CHAMPS Account # _____

BANNER C-FOAPAL: C: _____ F: _____ O: _____ A: _____ P: _____ A: _____ L: _____

TIME AND MATERIAL PROPOSAL

DATE: March 16, 2009

To: Jim Clark

Phone: 333-3954 **Fax:** _____

From: Thomas Doud

Phone: 244-3686 **Fax:** 244-5200

Subject: Occupancy sensors for office areas

Facilities & Services has developed the following general scope and expected cost for your review and approval
 The project ID or Work Order is 4456682C Please, reference it on all correspondence concerning this project.

| No. | ITEM | Expected Cost |
|---|---|----------------------------|
| 1 | This estimate covers installation of occupancy sensors and cover plates in offices at the Illini Union. | |
| 2 | The rooms that will receive occupancy sensors are on the list as provided by Eva Sweeny | |
| 3 | This estimate covers materials, labor and supervision. | \$ 12,650.00 |
| Expected Cost (Time & Material, Straight Time) | | \$ 12,650.00 |
| Add for Overtime Work | | \$ - |
| TOTAL EXPECTED COST, TIME & MATERIAL | | \$ <u>12,650.00</u> |

NOTE: This form cannot be altered by the customer or user. Additions or modifications require a revision in the scope of work and the associated expected cost. Altered proposals will be cancelled.

If this general scope of work and expected cost are acceptable, and if you desire the work to be performed on a **TIME & MATERIAL** basis, please provide an account number and this form will serve as authorization to proceed.

Please accept or decline this proposal within 30 days.

Authorization: Accept Decline Revise

If accepted, I agree with the general scope and the expected cost as presented and understand that a detailed scope will be completed prior to commencement of work. I understand this work is being performed on a time & material basis and the actual cost may exceed the expected cost.

Department authorization: _____

Date: _____

CHAMPS Account # _____

BANNER C-FOAPAL: C: _____ F: _____ O: _____ A: _____ P: _____ A: _____ L: _____

TIME AND MATERIAL PROPOSAL

DATE: March 16, 2009

To: Jim Clark

Phone: 333-3954 **Fax:** _____

From: Thomas Doud

Phone: 244-3686 **Fax:** 244-5200

Subject: Occupancy sensors for meeting room areas

Facilities & Services has developed the following general scope and expected cost for your review and approval
 The project ID or Work Order is 4456682D Please, reference it on all correspondence concerning this project.

| No. | ITEM | Expected Cost |
|---|---|---------------------------|
| 1 | This estimate covers installation of occupancy sensors and cover plates in meeting rooms at the Illini Union. | |
| 2 | The rooms that will receive occupancy sensors are on the list as provided by Eva Sweeny | |
| 3 | This estimate covers materials, labor and supervision. | \$ 5,940.00 |
| Expected Cost (Time & Material, Straight Time) | | \$ 5,940.00 |
| Add for Overtime Work | | \$ - |
| TOTAL EXPECTED COST, TIME & MATERIAL | | \$ <u>5,940.00</u> |

NOTE: This form cannot be altered by the customer or user. Additions or modifications require a revision in the scope of work and the associated expected cost. Altered proposals will be cancelled.

If this general scope of work and expected cost are acceptable, and if you desire the work to be performed on a **TIME & MATERIAL** basis, please provide an account number and this form will serve as authorization to proceed.

Please accept or decline this proposal within 30 days.

Authorization: Accept Decline Revise

If accepted, I agree with the general scope and the expected cost as presented and understand that a detailed scope will be completed prior to commencement of work. I understand this work is being performed on a time & material basis and the actual cost may exceed the expected cost.

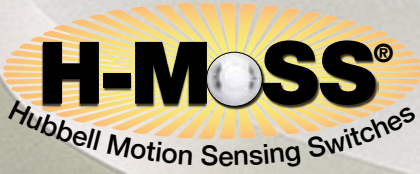
Department authorization: _____

Date: _____

CHAMPS Account # _____

BANNER C-FOAPAL: C: _____ F: _____ O: _____ A: _____ P: _____ A: _____ L: _____

H-MOSS[®] Occupancy and Vacancy Sensors



**Tomorrow's
Technology
Today!**



**Adaptive Technology • Dual Technology
Ultrasonic • Passive Infrared**



Wiring Device-Kellems

H-MOSS® Occupancy Sensors feature the latest in technological advances.

Adaptive Technology

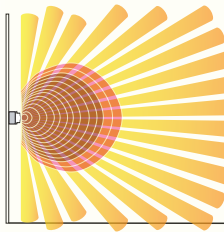
Adaptive Technology is a Hubbell breakthrough that delivers benefits to the building owner and occupants. The building owner gets reduced energy costs, fewer adjustments and less maintenance. The building occupant experiences fewer false-offs, disturbances and lower energy costs.

Adaptive technology sensors use microprocessor-based technology which makes all the decisions for setting adjustments. Internal software constantly monitors the controlled area and automatically adjusts the sensitivity and timer based on environmental history. This means that instead of manually adjusting the sensor for seasonal changes, modified airflow, and furniture layout or occupancy pattern changes, the sensor will automatically adjust itself. These automatic adjustments will eliminate the need for multiple adjustments by maintenance, personnel or outside contractors.

Hubbell offers adaptive technology throughout its product offering (wall switches, ceiling and wall mount sensors) in conjunction with dual technology (ultrasonic and passive infrared), ultrasonic, and passive infrared products.

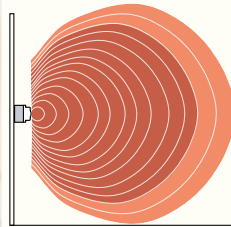


Dual Technology



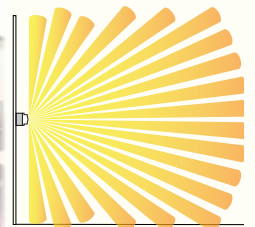
Dual technology occupancy sensors use both passive infrared and ultrasonic technologies for maximum reliability. These sensors also minimize the risk of false triggering (lights coming on when the space is unoccupied). Both ultrasonic (US) and passive infrared (PIR) technologies must detect occupancy to turn lighting on, while continued detection by only one technology will keep lighting on. The dual technology sensors are the best performing sensor for most applications.

Ultrasonic (US)



Ultrasonic technology senses occupancy by bouncing ultrasonic sound waves (32kHz - 45kHz) off objects in a space and detecting a frequency shift between the emitted and reflected sound waves. Movement by a person or object within the space causes a shift in frequency, which is interpreted as occupancy. Ultrasonic occupancy sensors are good at detecting minor motion (e.g. typing, reading) and do not require an unobstructed line-of-sight, thus making them suitable for applications such as an office with cubicles or a restroom with stalls.

Passive Infrared (PIR)



Passive Infrared (PIR) technology senses occupancy by detecting the difference between heat emitted from the human body and the background space. PIR sensors require an unobstructed line-of-sight for detection. These sensors utilize a segmented lens, which divides the coverage area into zones. Movement between these zones is interpreted as occupancy. PIR sensors are good at detecting major motion (e.g. walking) and work best in small, enclosed spaces with high levels of occupant movement.

Energy Savings with Occupancy Sensors



Typical Applications



Wall Switch



Ceiling Sensor



Wall Sensor



Applications are generalized. Consult your Hubbell representative for the type of technology and products that fit your needs.

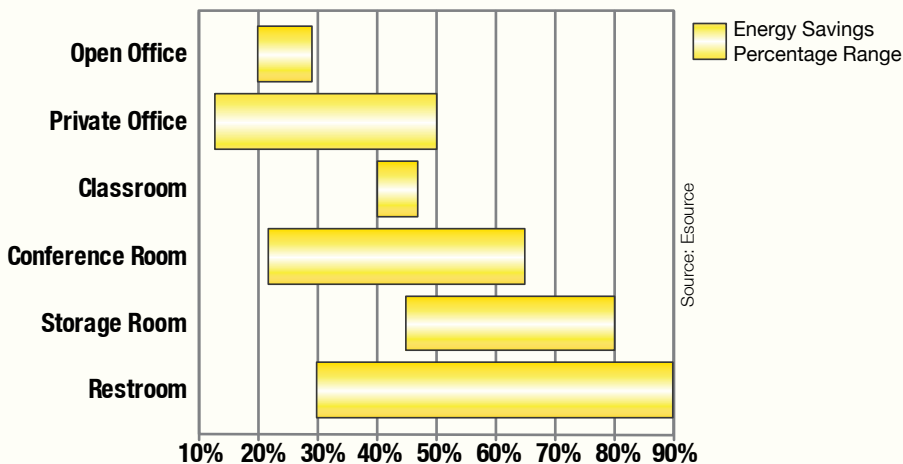
Occupancy Sensors = Energy Savings

For many years, occupancy sensors have been highlighted as a way to reduce energy consumption. The California Department of Energy has stated that lighting accounts for 35-45% of an office buildings energy use.

As seen in the chart, occupancy sensors can potentially reduce lighting use by 13-90%. In a large office building, for example, occupancy sensors can be an excellent way of reducing energy costs for both building operators and tenants.

| Location | Passive Infrared (PIR) | Ultrasonic | Dual Technology | Sensor Style |
|-------------------------|------------------------|------------|-----------------|--------------|
| Bedroom | ✓ | | | 1 2 |
| Cafeteria | ✓ | ✓ | | 1 2 |
| Closet | ✓ | ✓ | | 1 |
| Conference Room | | ✓ | ✓ | 1 2 3 |
| Classroom | | ✓ | ✓ | 2 |
| Lecture Hall | | | ✓ | 2 |
| Library | | ✓ | | 2 |
| Hallway | | ✓ | | 2 |
| Rest Room (multi-stall) | | ✓ | ✓ | 1 2 |
| Private Office | ✓ | ✓ | ✓ | 1 2 |
| Storage | ✓ | ✓ | | 1 2 3 |
| Lobby | ✓ | | ✓ | 1 2 3 |
| Warehouse | ✓ | | | 3 |

Potential Energy Savings Using Occupancy Sensors



Return on Investment (ROI)

Occupancy sensors can save a building operator or tenant money, but what is the return on investment (ROI) for a capital expenditure of this nature? Hubbell has developed a tool, the H-MOSS® ROI Worksheet, that can be accessed from the Hubbell website, www.hubbell-wiring.com, or from a Hubbell representative. This simple-to-use worksheet helps calculate present annual energy costs without sensors and estimated annual costs with sensors. The savings and short payback time can be surprising.

As energy costs continue to climb, standards and codes become more stringent, and the “greening” of commercial and residential buildings increases across the country, you should look toward Hubbell Occupancy Sensors to help decrease your energy costs.

H-MOSS® ROI Worksheet

The H-MOSS ROI Worksheet is a grid-based tool for calculating the return on investment for occupancy sensors. It includes columns for: # Lamps, Watts Per Lamp, Total Watts, Total kWh, Utility Rate Per kWh, Annual Operating Hours, % Savings, and Annual Savings. A 'Payback Calculation' section at the bottom includes fields for Annual Savings, Material Costs, Labor Costs, and Payback in Months. The grid contains numerical values for various lamp types and wattages.

Layout Capabilities and Technical Support

Hubbell representatives are available to meet and discuss any project, large or small. We can provide an occupancy sensors layout based on blueprints, either in electronic or paper form and a bill of material (BOM). All questions can be addressed by our technical service group that is always available.



Reduce Energy

Reduce Energy Consumption and Meet Federal and State Standards and Guidelines

Reduction of energy consumption at all levels: local, state and national is critical. Today's buildings, both commercial and residential - new and renovated - must follow new state and federal standards and codes which call for energy efficiency throughout a facility.

LEED

LEED (Leadership in Energy and Environmental Design) which is sponsored by the U.S. Green Building Council (USBC) has created a rating system to define what constitutes a green building by establishing common standards of measurement, and promoting integrated and whole building design. This certification applies to both new and renovated commercial buildings. Points are awarded by category and there are four levels of certification- certified, silver, gold and platinum.



H-MOSS, Hubbell Motion Sensor Switches offer a large array of occupancy sensors, which can be utilized to help increase energy efficiency in the following categories:

LEED Credit Categories

Sustainable Sites- SS
Light pollution reduction

Energy and Atmosphere- EA
Optimize energy performance

Indoor Environment Quality- EQ
Controllability of systems, lighting

Innovation & Design Process- ID
Innovation in design