Technology Innovation Project *Project Brief*

TIP 247: Image Processing Occupancy Sensor (IPOS)

Context

Infrared or ultrasonic occupancy sensing has been an energy efficiency strategy for decades. These sensors detect motion, providing feedback and control based on occupancy. Control system responses may include changes to temperature set points, dynamic ventilation rates, lighting control or security system response.

Unfortunately, the fundamental operating principle of the technology, motion detection, has limitations. Occupants who read or type at a desk may not be detected, and the lights may be turned off.

Current occupancy sensors are based on old security technology and are still effective in that role, but are less effective for lighting or HVAC control because there is less motion to detect. Occupant satisfaction with the resulting poor lighting or HVAC control often results in the restriction of occupancy-based controls, minimizing energy savings.

Description

Occupancy sensors are used to infer the presence or absence of people, in order to minimize energy use. This project proposes to develop and demonstrate a cost-effective occupancy sensor based on cell phone camera technology and novel image processing techniques to identify and classify occupancy, even in the absence of motion. Additional occupancy information can be captured, including the number of occupants and the level of activity. Based on this information, additional temperature, ventilation and lighting control may provide additional energy savings. Additional value could be possible from future security system integration.

Also notable is a possibility for partitioning zones that would reduce the number of sensors needed for a particular application. More robust and multi-use sensors, could cost effective and have a longer effective lifetime. Based on a demonstrated 5 percent improvement over traditional occupancy sensors, this project represents a potential of 32.7 aMW to offset regional load growth.

An enhanced IPOS prototype will be built using commercially available components to demonstrate proof-of-concept, robustness and multiple value proposition.

Why It Matters

This project reinforces BPA's energy efficiency leadership reputation and supports BPA achieving energy efficiency targets. This project will develop and demonstrate a new occupancy sensing technology, which may be more robust, require less calibration, is less expensive and provide significant energy and non-energy applications. This project aligns directly with a technology gap listed as a high priority for Research and Development in the BPA Energy Efficiency Technology Roadmap.

Goals and Objectives

In FY13, the project will produce the following results:

- Embedded development environment setup
- Camera integration with target hardware
- Field testing with a potential commercialization partner
- Documentation in an IPOS enhanced prototype report

Deliverables

- IPOS test plans
- The final report will summarize the results and key outcomes of the two stage gates.

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Project Start Date: 10/01/11

Project End Date: 9/20/13

Reports & References (Optional)

Links (Optional)

Participating Organizations

National Renewable Energy Laboratory

Funding

Total Project Cost:	$466,176
BPA Share:	$216,176
External Share:	$250,000
BPA FY2013 Budget:	$100,000

For More Information Contact

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