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**BONNEVILLE POWER ADMINISTRATION
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CONTACT: Joel Scruggs, 503-230-5511
503-230-5131

BPA project receives innovation award for new occupancy sensors
Researchers expect image-processing sensors to unlock big energy savings

Portland, Ore. – The Bonneville Power Administration explores technologies that can help Northwest homeowners, farmers, businesses and industries cut their energy use and save money on their electric bills. BPA’s recent work with image-processing occupancy sensors has been recognized by R&D Magazine as one of the most significant technology innovations for 2013.

With funding from BPA, researchers at the Department of Energy’s [National Renewable Energy Laboratory](#) have developed an occupancy sensor that uses smartphone components and open-source recognition software to detect people in a room. The image-processing occupancy sensor detectors, or IPOS, are about 20 percent more accurate than traditional motion-sensing technology, according to initial studies, and can potentially unlock enormous energy savings. The device, which is available for license, does not reveal the identity of occupants, only their presence.

“We’re honored for this project to receive this prestigious award,” said Richard G nec , BPA’s vice president of Energy Efficiency. “I’m proud that our work to bring new efficient technologies to the people of the Northwest is being recognized.”

For the past 30 years, most occupancy sensors relied on motion detection and often performed inconsistently.

“Occupancy sensor technology needs to be updated so we don’t have to

wave our arms to keep the lights on or have a bunch of well-lit empty rooms,” said engineer Mira Vowles, who managed the NREL research project for BPA’s Emerging



IPOS detectors combine smartphone technology and open-source recognition software to detect movement in a room with an accuracy of more than 90 percent. (Photo by Dennis Schroeder, NREL)

Technologies team.

Since lighting accounts for about 40 percent of the commercial electricity use in the Northwest, BPA and NREL, DOE's main laboratory for renewable energy and energy efficiency research, pursued the idea that better and more robust occupancy sensors could lead to big energy savings. So in 2011, the two agencies kicked off new research that expanded upon an original concept of image-processing occupancy sensors.

But IPOS isn't just a breakthrough for lighting controls. The size of a stick of gum, IPOS combines an inexpensive camera with a high-speed microprocessor and computer algorithms to detect movement and human presence in a room. It can also count the people in a room, document their location and register their activity level — information that could be useful in regulating a building's ventilation.

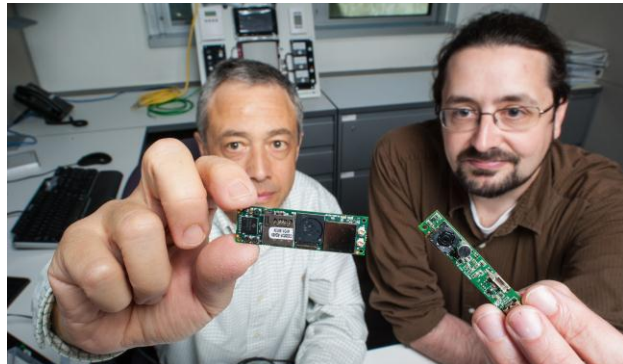
“It offers the potential of putting lighting or ventilation only where it's needed,” said NREL senior engineer Larry Brackney, who developed the system with colleague Luigi Gentile Polese.

Initial studies show it's extremely accurate, boasting detection accuracy rates above 90 percent. In addition to detecting occupants, the camera and computer vision algorithms also recognize spots where there aren't any people and measure the level of luminance and other variables.

Researchers are looking beyond controlling lights and air conditioning systems. Other potential applications include daylight harvesting, daylighting system commissioning, occupancy logging and daylight logging, as well as other uses in security, energy efficiency and customer interactivity.

Even though motion-detection systems are mandated for most new construction, only 7 percent of commercial spaces in the United States have such a system installed. In the Northwest, BPA sees the new sensor detectors as another product to help Northwest commercial businesses and office buildings reduce their electricity use.

“Innovative new technologies like this are critical to BPA's ability to support the region's growing power needs through energy efficiency,” added Gécécé.



NREL researchers Luigi Gentile Polese, left, and Larry Brakney hold the processor and camera that make up the image processing occupancy sensor. (Photo by Dennis Schroeder, NREL)

The new system is currently being tested in a few environments, including a large retailer in Centennial, Colo. The two-year project, which is jointly funded by [BPA's Technology Innovation program](#) and the Golden, Colo.-based NREL, is scheduled to wrap up later

this year. At that time, BPA and NREL will summarize the key outcomes in a final report.

The [R&D 100 Awards](#) honor the most significant new technology products to enter the market in a mix of industry sectors. Winners, selected by an independent panel and the editors of R&D Magazine, will be recognized at a banquet on Nov. 7 in Orlando, Fla.

BPA's [emerging technologies program](#), often referred to as E3T, is a collaborative effort between BPA, Northwest publicly owned utilities, manufacturers, researchers, universities and experts to identify and advance new technologies with the greatest potential to help the region achieve the energy efficiency goals set by the Northwest Power and Conservation Council. The program also performs quality assurance tests and provides subsidies for energy-efficient equipment and incentives for manufacturers to develop better products.

BPA's E3T team is also demonstrating and evaluating new technologies related to variable capacity heat pumps; heat pump water heater applications; advanced lighting innovations, including LEDs; rooftop air conditioning; and energy management, including behavioral-based savings.

BPA is a nonprofit federal agency that markets renewable hydropower from federal dams in the Columbia River Basin, operates three-quarters of high-voltage transmission lines in the Northwest and funds one of the largest wildlife protection and restoration programs in the world. BPA and its partners have also saved enough electricity through energy efficiency projects to power four large American cities. For more information, contact us at 503-230-5131 or visit www.bpa.gov.

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Bonneville Power Administration
905 N.E. 11th Avenue, Portland, Oregon 97232
503-230-5131 | Fax: 503-230-4019 | www.bpa.gov