August 2009

Pennsylvania's Energy Partnership

Regional Approaches to Efficiency, Conservation and Innovation

NADO
NATIONAL ASSOCIATION OF DEVELOPMENT ORGANIZATIONS
RESEARCH FOUNDATION

Setting a Higher Standard

Pennsylvania's seven Local Development Districts, in partnership with the state and Penn State University, are testing new methods and strategies for saving money and energy through new technologies and innovations.

"Those numbers are dead accurate. We realized electricity savings of 60 – 80 percent. We share a light with an adjoining township, and we share its expenses. I got a call from that township asking if the meter was broken."

- **Benedict Vinzani, Jr., Borough Manager, Somerset Borough**

Somerset Borough, a Pennsylvania municipality with about 7,000 residents, replaced incandescent light bulbs in its traffic signal lights with energy-efficient light-emitting diode (LED) lamps early in the fall of 2008.

Somerset's borough manager, Benedict G. Vinzani, Jr., admits to having felt some initial skepticism about "the savings numbers being thrown around." They sounded high.

"Those numbers are dead accurate," Vinzani says now. "We realized electricity savings of 60 – 80 percent. We share a light with an adjoining township, and we share its expenses. I got a call from that township asking if the meter was broken."

High-efficiency, LED Traffic Light

The Somerset experience is similar to that of others involved in Pennsylvania's Energy Partnership (PEP), an effort sponsored by a consortium of the Commonwealth's seven local development districts (LDDs), recently renamed as the LDD Network.

Funding comes primarily from the Appalachian Regional Commission (ARC) and the Pennsylvania Department of Community and Economic Development (DCED).

The PEP program is designed to help municipalities, schools and nonprofit agencies (such as community hospitals) reduce their energy use. Most client agencies are boroughs or townships (two of Pennsylvania's classifications for small municipal

jurisdictions). In addition to the traffic signal retrofit project, the LDDs in PEP are engaged in three open-ended conservation activities: first-impression assessments of energy savings opportunities in buildings, utility bill analysis and training to identify conservation opportunities.

Not all LDD participants are on the same timetable. Some are just beginning traffic signal work. Others are exploring the links between energy conservation and long-range goals like environmental stewardship and economic development. *[For examples of these initiatives, see "Energy Projects Beyond the Partnership" on p. 10 - 11.]*

Energy Assessments: Looking for Low-Hanging Fruit

Energy use assessments are "essentially a walk-through of a facility looking for the obvious," explains William Rupert, energy program manager for the Northwest Commission.

Many easy-to-spot building improvements involve weatherization—adding insulation or blocking cold air infiltration. Others involve changing human behaviors. "Are people leaving lights on in the bathroom all day?" Rupert continues. "Do they have two or three old chest freezers in a basement that they got for free and are running unnecessarily? Things like that are pretty low-hanging fruit."

More sophisticated analyses require specialized equipment. The LDD Network is seeking funds for purchase and training in the use of devices like blower doors (to measure air infiltration), thermal imaging cameras (to pinpoint sources of building heat loss) and other diagnostic tools that can help prioritize energy conservation investments.

Two of the participating LDDs, SEDA-Council of Governments (SEDA-COG) and North Central Pennsylvania Regional Planning and Development Commission, already have such capabilities. SEDA-COG has been involved in low-income home weatherization since 1976 and administers the Low Income Weatherization Assistance Program in seven of its 11 counties. It now also offers energy assessments to other entities, including private businesses, on a fee-for-service basis.

An energy efficient home, built with Energy Star-rated appliances

One North Central staff member, Barry Mayes, is certified under international standards governing use of infrared thermal imaging technology in building diagnostics. Mayes is working toward reaching the next level of certification, thereby giving the LDD Network the option of using his expertise to oversee similar technical work performed by other LDD staff members.

At work with an infrared thermal imaging camera

Source: NCPRPDC

Brandon Carson, an economic development planner for the Southern Alleghenies Planning and Development Commission (SAP&DC) who also serves as the PEP coordinator, reports that LDD Network members completed 39 energy assessments during the first 15 months of the PEP program. The group has a backlog of about 100 utility bill analysis requests.

The LDD Network has also referred over 80 requests from residential and commercial property owners, who are ineligible for PEP assistance, to other agencies.

Utility Bill Analysis: Tracing the Trickles of Watts and Pennies

"In doing a diagnostic assessment, you start with the utility bill," explains Stacy Richards, director of SEDA-COG's Energy Resource Center. "You can't prioritize without knowing all energy costs."

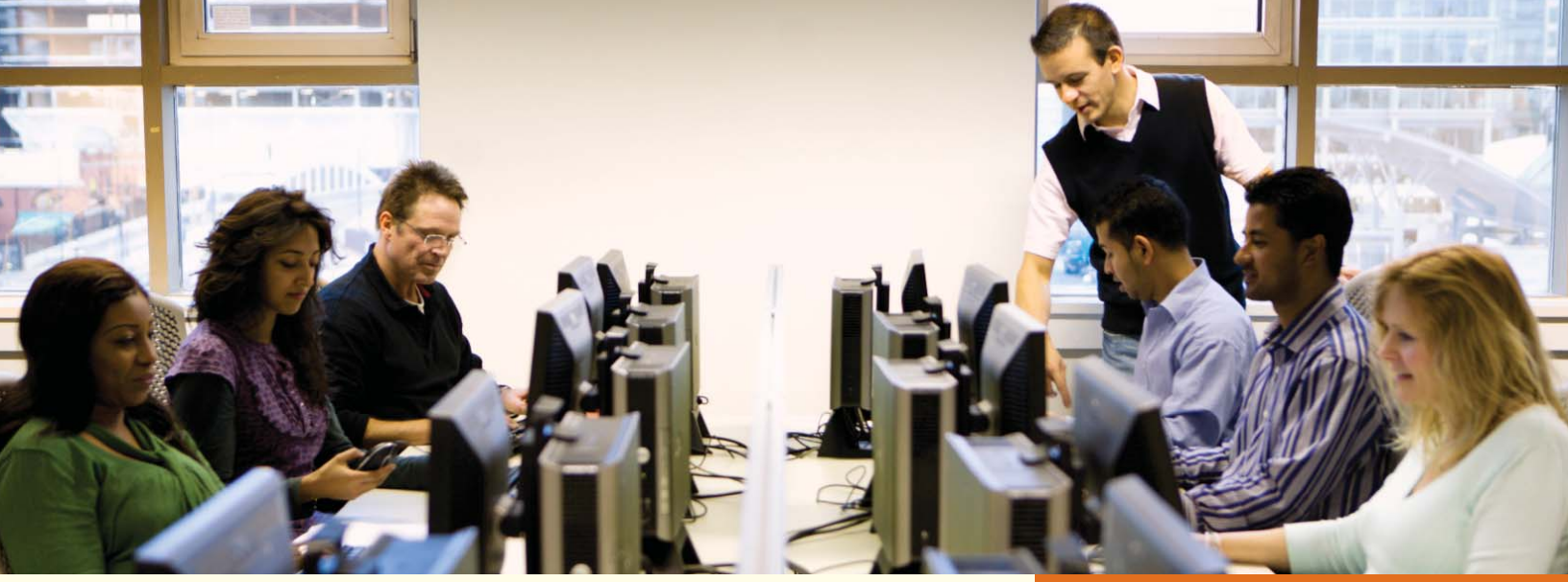
A utility bill analysis entails matching electrical outlets, lights and other devices to specific electrical circuits and utility accounts. Then, based on two years worth of utility bills, consumption and cost data are entered into a computer spreadsheet. Client organizations receive the resulting analysis in the form of graphic displays.

That sounds straightforward and fairly simple, as it would be for residential and commercial energy users with only one or two meters. But local governments have added street lights, traffic signals and pumping stations at irregular intervals across many decades, and with them new circuits and new meters.

When different municipal departments (police or water, for example) have separate budgets, utility accounts may exist under different names and be billed to different addresses. "It's not unusual," Richards says, "for a borough to have at least 35 meters. They don't know what they're spending on energy or how they're spending it."

Kurt Bauman, government services manager for the Northeastern Pennsylvania Alliance (NEPA), estimates that a typical bill analysis requires about 80 person-hours, including conversations with municipal employees.

In addition to receiving the initial analysis, the municipal, school or nonprofit clients receive the



software program that generated it to allow them to continue tracking their energy usage.

Training Sessions: Casting a Wide Net

It is infeasible for the LDD Network staff to do walk-through assessments of every municipal building or school in the service area, or to complete utility bill analyses for every eligible entity.

So PEP offers a broader educational program—also aimed at municipal, school and nonprofit staff—built around two workshops.

"Energy 101," as its name suggests, is a basic, four-hour introduction to energy conservation with a strong focus on the analysis of energy use in buildings.

"Strategic Energy Planning" focuses on specific strategies, including capital investments for managing energy usage over periods of five to 10 years. It tends to attract representatives from the larger municipalities within the LDD Network region.

Both workshops were developed and are conducted by Larry Myers, an engineer employed by TAC, an international corporation with expertise in multiple aspects of building management.

All seven LDDs have held or scheduled these presentations at least once. By mid-2009, the LDD Network had held a total of

When different municipal departments have separate budgets, utility accounts may exist under different names and be billed to different addresses.

Diagram of potential home energy and air flow leakages

“The total dollar impact for any one municipality isn’t going to appear to be a home run. If you look at it in the aggregate, you begin to see the results.”

- **Randy Rice, Director of Planning and Community Development, Northwest Commission**

66 training workshops, providing training for 877 individuals from client organizations.

Municipalities participating in LDD Network programs report savings estimated at a few hundred, or even a few thousand, dollars per year.

These are important to the small towns involved, and they add up. “The majority of our 265 municipalities tend to be small with relatively low budgets,” says Randy Rice, director of planning and community development for the Northwest Commission. “The total dollar impact for any one municipality isn’t going to appear to be a home run. If you look at it in the aggregate, you begin to see the results.”

A Signal Success Story

One way to demonstrate the money-saving potential of energy conservation is to focus on a technical fix known to be both cost-effective and widely applicable. The LED Traffic Signal program fits that description.

According to data supplied by Haley Sankey, regional energy coordinator for the SAP&DC, the initial LED materials cost is about $2,000 per intersection, plus an additional $1,000 for installation. Small municipalities are often unable or unwilling to make this kind of up-front investment.

However, LED lights use approximately 85 percent less energy than the incandescent bulbs they replace. They are


Source: Somerset Borough

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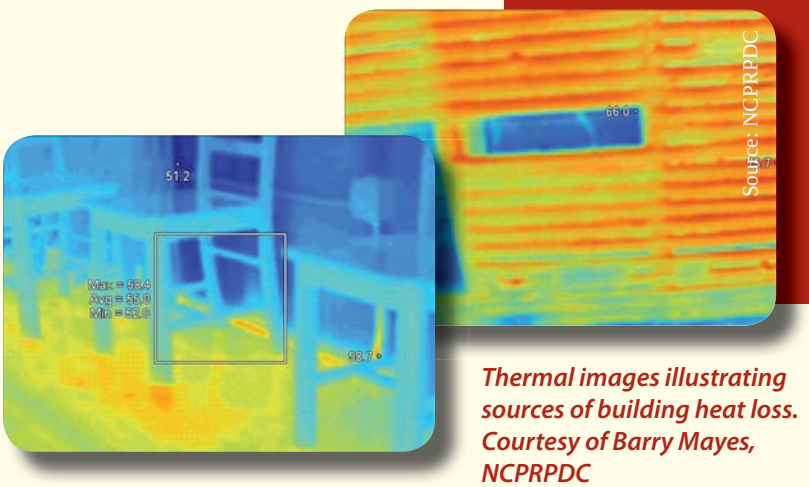

Thermal images illustrating sources of building heat loss. Courtesy of Barry Mayes, NCPRPDC

also brighter and are expected to last up to 10 times longer.

During PEP's first year, three LDDs—SAP&DC, SEDA-COG and Northwest Commission—joined forces to arrange a bulk purchase of LED components for traffic signal lights. They negotiated a 25 percent discount, worth approximately $80,000, from the Hite Company, a distributor approved by the Pennsylvania Department of General Services.

By May 2009, NEPA was managing requests from 31 municipalities. SAP&DC had completed conversions for 50 intersections in 14 municipalities. SEDA-COG, working with 37 municipalities, had completed conversion of 125 intersections to LEDs. The remaining four LDDs began their efforts during the first half of 2009.

SAP&DC expects its municipalities to save about $40,000 annually in electricity costs. SEDA-COG estimates annual savings from its work at about $100,000.

Evaluating Results and Planning Next Steps

Neil Fowler, director of the state DCED's Appalachian Development Center in Harrisburg, provides state-level oversight for PEP. He says that PEP funding in fiscal year 2007 totaled $400,000, divided evenly between DCED and the ARC.

In fiscal year 2008, ARC funding rose to $325,000 and was supplemented with $250,000 in state funding and $175,000 in local funds, bringing the total project cost over two years to $1.15 million. The LED Traffic Signal Program was the single most expensive PEP program element.

"We are really thrilled with the way this program is progressing," Fowler says. "The LED component has attracted a lot of interest. What we want to continue to stress is taking the UBA [utility bill analysis] information and adding value to the services provided."

The Pennsylvania State University (PSU) Center for Policy Research on Energy, Environment and Community is charged with evaluating the PEP initiative as a whole. Savings from the LED retrofit program component should be relatively measurable.

For example, SAP&DC expects its municipalities to save about $40,000 annually in electricity costs and SEDA-COG estimates annual savings at about $100,000.

The Traffic Signal Program subsidized most installation costs for participating municipalities. However, taking only electricity costs into account and assuming

Assessing home energy leakages using a sealed door fan

no grant funding, the payback period for LED installations is estimated at three years using current prices. These preliminary estimates do not take into account reduced maintenance costs.

Most municipalities plan on replacing red and green incandescent signal lamps annually (and replacing yellow lamps as needed). If LED lamps last for 10 years as expected, maintenance costs during that decade may be limited to occasional lens cleaning.

Measuring return on investment is also complicated by uncertainty about future energy costs. On December 31, 2010, Pennsylvania is scheduled to complete a multi-year process of removing price caps on electricity. No one can be sure how much current prices will rise. Recent estimates vary from around 10 percent to over 30 percent. Any such increase would make current savings estimates look conservative.

The impacts of more open-ended program components are even harder to quantify. For example, the actual effect of the utility bill analysis effort will depend on the extent to which municipalities follow up on the information contained in those reports.

Amy Glasmeier, director of the PSU Center for Policy Research on Energy, Environment and Community, suggests that some benefits may be impossible to quantify—especially the value of interaction between the LDDs and small municipalities.

“There’s an exchange of different and more sophisticated information about the practices of the clients,” Glasmeier reports. “That sophistication spills over into all the activities that they do. The LDDs are increasing the future competency of the municipalities. It’s a side benefit that’s quite substantial because

Source: NEPA

Clarks Summit Borough is presented a check for the Traffic Signal Conversion Program

it's linked in a chain to workforce development, resources coming into the community and better operational practices."

Barbara Kinne, who assists Glasmeier on the evaluation, says that municipalities responding to a client satisfaction survey reported results "nothing short of eye-popping." There was, Kinne adds, "an incredible raising of awareness about energy conservation opportunities."

Ralph Stewart, Bellefonte borough manager, confirms that working with the SEDA-COG staff heightened his and the borough council's awareness of conservation opportunities.

After seeing the results of traffic light retrofits, Bellefonte is looking at using LED lamps for street lighting. Stewart also expects major savings from a water department switch from fixed-speed pumps to newer, variable-speed models. And last fall, when it came time to replace a police car, the Bellefonte police bought a motorcycle.

"SEDA-COG focused on buildings," Stewart reports. "That process helped us start looking beyond buildings. You start to find savings, and you start to become aware. I hate to say it, but I think a lot of municipalities just think, 'We need pumps, and when they're on they're on.'"

Municipalities may not realize that there are new technologies and smarter ways to operate heavy users of energy. "That's almost our mindset now. One thing leads to another. We're all trying to be aware that we need to save energy, and that saves money." §

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- **Amy Glasmeier, Director, Penn State Center for Policy Research on Energy, Environment and Community**

Energy Projects Beyond the Partnership

When they're not poring over municipal utility bills or helping small towns upgrade traffic signal lights, the local development districts within the Pennsylvania LDD Network pursue a variety of energy-saving ideas. Some are already in action. Others are forward-looking attempts to position their regions to capitalize on the economic development potential of conservation and environmental protection.


Source: SEDA-COG

The Southwestern Pennsylvania Commission (SPC), the Southern Alleghenies Planning and Development Commission (SAP&DC) and SEDA-Council of Governments all made energy conservation a priority well in advance of the creation of the Pennsylvania's Energy Partnership (PEP) initiative:

• The SPC, based in Pittsburgh, is participating in the renovation of a 31-story downtown office building built in the early 1950s almost entirely of aluminum.

Once the world headquarters of the Alcoa Corporation, the Regional Enterprise Tower has approximately 360,000 square feet of office space. The renovations will improve energy efficiency in lighting, the HVAC system and mechanical operations like elevator motors.

• The SAP&DC, headquartered in Altoona, helped the Juniata Valley School District secure funding from the Appalachian Regional Commission to incorporate energy-saving technology into a major renovation and expansion of a district high school building. The improvements include lighting upgrades, demand-control ventilation and equipment for recovering waste heat from chilling and circulating water and air.

The school district expects that the project will save money on energy costs and educate students and the community on the benefits of conservation.

• SEDA-COG, based in Lewisburg, has a long history of strategic thinking about points at which energy conservation, environmental preservation and economic development intersect.

It is partnering with REDDI, a Harrisburg-based economic development district, to help component manufacturers identify market niches in alternative energy. *[For details, see REDDI Promotes Readiness on p 12 - 13.]*

In 2005, SEDA-COG secured seed money from ARC to conduct design work on a 14,000-square-foot office to house its own staff and to serve

Transporting a wind turbine blade

Source: Penn State

as a regional demonstration center for technology related to energy conservation and alternative energy applications.

The design won a NADO Innovation Award and met the "Gold" (second-highest) Leadership in Energy and Environmental Design (LEED) standard. (The highest rating, "Platinum," is reserved for buildings linked to mass transit facilities, which do not exist in Lewisburg.)

Site improvements like pervious pavement in walkways and parking areas, and an innovative storm water management system have been installed (at a cost of about a half million dollars), but work on the building itself—hyper-insulation and geothermal energy heating—will begin if and when funding becomes available. SEDA-COG is also applying for grants to conduct a detailed inventory of potential alternative energy sources across its region. "We're viewing our 11-county region as a regional energy shed, similar to a watershed," says Stacy Richards, director of SEDA-COG's Energy Resource Center.

"Renewable energy is renewable, but it still taps into finite resources. There's only so much land, only so much feedstock. We don't know how much there is or where it is. We're hiring a consultant to inventory our renewable energy feedstocks and their locations. That will help us develop business scenarios for those most promising projects that would foster local ownership and local use," explains Richards.

"We are really a breadbasket for renewable energy development," Richards continues, making clear that she's talking about Pennsylvania's entire LDD Network, not just the SEDA-COG area.

"Our open space sets us to have wind farms and solar arrays. We have the agricultural land and the forested land, which are feedstocks for renewable energy. You might have stronger solar or more wind in the western parts of the United States, but they are not necessarily in close proximity to major markets. The best economic value will be if we both use the energy and at least have partial ownership of the projects. That's why we're focused on education—to help folks understand that we have enormous potential here to control our destiny, rather than have ownership only from outside of our region." §

Source: Penn State

Pennsylvania Energy Expo

REDDI Promotes Readiness Based on Regional Manufacturing Strengths

During the California Gold Rush of the 1850s, countless prospectors bet their futures on guesses about which claims would pan out. Others chose less glamorous but less risky roads to wealth: they sold picks, shovels, shoes and groceries to the prospectors.

That second economic model—anticipating needs at strategic points along a supply chain—is REDDI's strategy for economic development based on alternative energy's future prospects. REDDI, which stands for Regional Economic Development District Initiatives of South-Central Pennsylvania, serves an eight-county region around Harrisburg, the state capital. It's one of eight economic development districts in Pennsylvania.

Created only seven years ago, REDDI made an early commitment to alternative energy development. Initially, ethanol production seemed a natural approach in Central Pennsylvania, a dairy farming region that grows corn and enjoys nearby rail access to Midwestern farms. But plans for an ethanol plant were dropped in the face of fierce "not-in-my-back-yard" opposition. Corn ethanol production looks less promising now, due to lower oil prices and increased concerns about using food for fuel.

"Our original pitch line was reducing dependency on foreign oil," says Russ Montgomery, REDDI's president. "That was true enough, but I came back and said, 'I haven't heard anybody talk about manufacturing. Somebody has to make the pumps and the wind generator parts.' We want to make sure that our manufacturing base is tied into component manufacturing for all sectors."

Central Pennsylvania already has a strong manufacturing base, so REDDI is helping firms think of themselves as part of a supplier network for alternative energy providers and customers.


Source: REDDI

Energy-efficient press building located in Harrisburg, PA

Montgomery's pitch today is that central Pennsylvania businesses may not be able to predict winners among competing technologies like solar, wind or biofuels. They can, however, think through how these technologies may affect demand for their products and services, especially hardware like motors, valves, switches and batteries. "People say, 'You'll have only so many solar collectors ever installed here in Pennsylvania,'" Montgomery adds. "That's true, but we're trying to set up a world-class system so that we're not just selling to Pennsylvania but to the nation and the world."

REDDI is partnering with SEDA-COG on this component manufacturing initiative. The SEDA-COG region, although largely rural, has a significant manufacturing base of its own.

Montgomery values SEDA-COG's hands-on experience in energy conservation for buildings—and the scope of the LDD's regional contacts. "SEDA-COG has been around for 40 years," he says, "and they're highly respected by the municipalities up there."

REDDI is also thinking strategically about opportunities in nuclear energy. A taboo subject in most regions, accepting nuclear as a viable energy source is especially bold for an organization whose office space is located only a few miles away from Three Mile Island, site of a reactor failure that has halted construction of new nuclear power plants in the U.S. for over three decades.

Montgomery thinks that nuclear power will sooner or later be considered safer and more environmentally friendly than coal-fired plants. Developing component manufacturing capability in the nuclear energy industry poses unique challenges. Where solar, wind, geothermal and biofuel applications are concerned, many manufacturers, large or small, may be able to fit easily into market niches.

By contrast, it seems certain that nuclear plant equipment components will have to meet such exacting quality standards that only a few manufacturers can hope to compete.

Montgomery is introducing regional component manufacturers to the industry's major potential players, "such as Siemens, GE and Westinghouse."

In October 2009, REDDI, in collaboration with Pennsylvania State University School of Mechanical and Nuclear Engineering, will convene business executives, academics and policy makers for a two-day seminar. The goal is to help Pennsylvania firms better understand the technology, the probable environment regulations and their own employee training needs.

"It's one thing to have a vision and an infrastructure," Montgomery says, "but you have to put all of this together. We're blessed with all these organizations. You don't have to create a new system. You have to connect. REDDI is a facilitator, a coordinator. We verify concepts through our research. Then we bring the appropriate players to the table. And they implement what they do well." §

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