Neighborhood Power Act of 2007

Creating energy-smart communities

BACKGROUND

The **Neighborhood Power Act of 2007 (NPA)** seeks to improve the energy situation of state and local governments throughout the United States by providing them the means to improve their efficiency of energy use and promoting renewable systems for powering their facilities.

While the resources provided in this bond program could apply to multiple elements of fixed infrastructure (such as insulation that reduces use of heating oil or solar systems that reduce use of natural gas for heating water), this brief background and framing discussion focuses on electricity and lighting technology.

Electricity and Lighting

America's electrical grid could be described as a decaying 20th-century industrial model confronting the 21st-century information age. There are significant inefficiencies in the production, management, distribution, and end use of electrical power.

Not only is the electrical system inefficient and polluting in the production of energy, but Americans are also highly inefficient in using electricity (and energy overall). Tremendous opportunities exist for reducing electricity usage through efficiency—with compact fluorescent (CFL) and LED light bulbs. The quickest way to reduce green house gas emissions is to use energy wisely, which does not mean Americans have to 'freeze to death in the dark' as opponents like to claim. Instead, conservation will provide significant financial payoffs for consumers, businesses and government.

- Lighting accounts for 22% of US electrical use today. As images from space at night illustrate, much of this lighting is inefficiently used. Additionally, many lighting products are inefficient.
- CFLs use roughly 27% of the electricity of traditional incandescent light bulbs (a technology dating from the days of Thomas Edison), and they reduce waste heat by some 70% while lasting roughly 8 times longer.
- Light-emitting diodes (LEDs), which are penetrating more lighting markets every day, use even less electricity than CFLs—between 20% and 80% less, depending on the lighting requirement. In other words, LEDs offer the potential for a reduction of more than 90% in electricity use from incandescent bulbs while lasting almost 50 times as long.

- According to Steven DenBaars of the University of California, Santa Barbara,

if 25 percent of the light bulbs in the United States were converted to LEDs putting out 150 lumens per watt (higher than the current commercial standard), the country as a whole could save $115 billion in utility costs, cumulatively, by 2025.[1]

As a path toward understanding the potential for LED lighting—as one element of potential savings—it is worthwhile to look at the Energy Star exit sign tech sheet.[2] Those ubiquitous signs over emergency exits in public buildings use surprisingly large amounts of energy. An older sign can use as much 350 kilowatt-hours (kWh)of electricity per year, weighing in at 574 pounds of carbon dioxide (CO_2) emissions. LED exit lights use 40 kWh, reducing CO_2 pollution to 72 pounds.

Imagine a **scenario**:

- A community has 1,000 exit lights throughout its schools, police stations, office buildings, community centers, and such.
- To replace those 1,000 exit lights with LEDs might cost $50,000 for the lights themselves and $10,000 more for labor.
- Hypothetically, imagine the total expense is $100,000. That is a large amount for most governmental structures around the country to put into just replacing exit lights.
- When citizens are calling for potholes to be fixed, rising gasoline prices make it ever more expensive to get children to school, and everyone agrees the fire engine requires replacing, it is understandable why $100,000 to replace lights might not be the top of the agenda.

However, we should consider the operating-cost implications:

- The 1,000 incandescent lights to be replaced use 350,000 kWh of electricity per year while the new LED lights would use 40,000 kWh.
- If electricity is $0.08 per kWh, the community's electric bills would be reduced from $28,000 per year to $3,200. The annual savings of $24,800 to make the change would fully pay for itself in just four years.

[1] "Cheaper LEDs to Light a Green Path?" *CNET News.com*, 19 January 2007, http://news.com.com/Cheaper+LEDs+to+light+a+green+path/2100-1008_3-6151515.html

[2] *Save Energy, Money, and Prevent Pollution with Light-Emitting Diode (LED) Exit Signs*, http://www.energystar.gov/ia/business/small_business/led_exitsigns_techsheet.pdf.

- This is not counting labor savings from a greatly reduced rate of light replacement (several orders of magnitude). This, alone, might reduce annual costs by $10,000 more.[3]
- If labor and energy savings are combined, the payoff might occur in less than two years. And the community would be safer, with fewer burnt-out emergency exit signs.

Cities Adopting LEDs

Cities across the country have recognized the value of LED lighting. Raleigh, NC, is going all-LED:

> Early projections indicate that the expense of retrofitting the . . . lighting system will get recovered in cost savings in two to three years, said Mayor Charles Meeker.
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> "We are saving over 40 percent of the energy we would otherwise use," said Meeker, who's currently on his third two-year term. "And the quality is better."[4]

Raleigh is not alone.

> Denver, Colorado, has installed 48,000 LEDs, replacing incandescents, "in traffic and pedestrian signals [that] has saved the city $800,000 per year in energy, labor and material cost, while reducing annual emissions of carbon dioxide by 2,937 tons on an annual basis."
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> In 2001, "Portland replaced nearly all its traffic signal lights (over 13,000) with LED lamps, which use less energy and last longer than incandescent lamps. The project was financed using an innovative lease-option that allowed Portland to implement with no up-front capital outlay. By 2001 LEDs were inexpensive enough for widespread use. Coupled with short-term utility rebates, these dropping prices meant that total costs were offset significantly; the project showed net positive cash flow in its first year."[5]

Returning to our hypothetical case: that up-front $100,000 investment is a barrier, both in conceptual and in real fiscal terms. The $100,000 precludes the local government from making a smart investment.

This is a classic cost-to-buy versus cost-to-own challenge that inhibits smart energy choices throughout the American economy—including state and local governments. The issue is far from limited to LED lighting options. But financial issues are only a part of the equation.

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[3] Actually, this is more an opportunity cost than direct fiscal savings. The labor costs once associated with replacing burnt-out lights could now be doing other things in the community—like filling potholes or repairing broken windows in the local schools.

[4] Michael Kannellos, "City Tries to Cut Energy Bills with LEDs," *CNET News.com*, 12 February 2007, http://news.com.com/2100-11392_3-6158103.html?part=rss&tag=2547-1_3-0-5&subj=news.

[5] Material from Denver and Portland lessons-learned studies available at http://www.sustainlane.us/category/c4.

Electricity is also a significant driver of US greenhouse gas (GHG) emissions, with half of US electricity coming from coal generation. Roughly, the average kilowatt-hour of electricity use in the United States generates 1.5 pounds of CO_2 pollution. In fact, the electricity industry is the largest source of global warming pollution in the United States: 40% of US carbon dioxide emissions come from electric power generation. Thus, efforts to foster efficient use of electricity, more efficient power generation, and moves toward renewable (non-CO_2 source) electricity generation have a large potential for reducing America's total CO_2 pollution loads (along with other pollutants from coal-fired electricity, such as mercury).

To quote DenBaars again regarding the LED lighting example,

> if 25 percent of the light bulbs in the United States were converted to LEDs . . . That would alleviate the need to build 133 new coal-burning power stations. . . . In turn, carbon emissions in the atmosphere would go down by 258 million metric tons.

Again, lighting represents 22% of US electricity use, which represents about 40% of US GHG emissions. But the reality is that it is not just lighting where real opportunities exist for payoffs in efficiency. Many public buildings

- Are poorly insulated and have too many leaks.
- Have appliances and other systems that are outdated, unreliable, and wasteful in power use.
- Have inadequate control systems—lacking, for instance, smart thermostats.

Inefficient use of electricity and the resultant pollution is the case, sadly, with most sectors of the economy: residences, businesses, industry, and government. Throughout the economy, whether in the private or public sector, there is a serious challenge:

- How do we balance the tight realities of today's finances and the issue of tomorrow's financial implications?
- This can be described as the cost-to-buy versus cost-to-own dilemma: how can additional funds for investing be leveraged today to reduce tomorrow's costs?

The **Neighborhood Power Act** seeks to assist state and local governments in addressing this dilemma regarding their infrastructure. It will spark accelerated investment in energy efficiency (in both energy use and energy production) and renewable energy programs in state and local buildings (and other infrastructure). And it will do so in a way that is not simply "efficient" in use of public resources but actually profitable in reducing the ongoing operating costs for these governments, reducing pollution, and enabling better provision of services to Americans across the country.