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## 10 IDEAS FOR ENERGY & ENVIRONMENT

July 2011

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10 IDEAS  
FOR  
ENERGY &  
ENVIRONMENT



*Congratulations to*  
**SHAYNA POLLOCK**  
*author of*  
**INCREASING URBAN DENSITY  
VIA A LEED ALTERNATIVE**

*Nominee for*  
**POLICY OF THE YEAR**





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# LETTER FROM WASHINGTON

We are pleased and proud to present the third edition of the 10 Ideas Series. Comprised of six journals, these articles represent the best of our student policy work from across the country. Students are told they are too young to participate in the policy process and that they must wait their turn. Roosevelt's founders believed, as we do, that the next generation of leaders deserves a voice in current political debates.

In the winter of 2009, the Roosevelt Institute Campus Network launched a national initiative called Think 2040, asking young people to design the future they want to inherit. Millennials nationwide contributed their individual visions at campus and regional Think 2040 conversations as well as through Think2040.org, a website designed to capture the values and ideas of a generation. These diverse voices were encapsulated in the recently released Blueprint for Millennial America; this summer we're proud to publish this set of policy ideas that will move us forward towards our shared vision for 2040.

Young people want to reinvent our social safety net to lift Americans up during tough economic times when support is most important. They want to see community needs drive investments in high-speed rail, build local green job corps, and devise a renewable energy market. Millennials identified preventative care and a culture of wellness as a key priority, with more access to fresh food and community health clinics. As future leaders, they want equity in opportunity for all Americans through access to quality education; they see it as vital for long-term economic growth and competitiveness in the world market. In order to inherit this future, we must start building it today.

Roosevelt members research, design and write their policy ideas from a grassroots perspective; in doing so, they exemplify a generation of committed practitioners who strive to understand public policy in the context of effecting long-term change. Yale is working to support the revitalization of city blocks in New Haven through loans to low-income entrepreneurs, while the health care policy center collaborated with Young Invincibles to design information toolkits for their graduating peers. Northwestern University received a grant to conduct a survey to establish a baseline of single-use disposable bag usage on campus and is also working with stakeholders in Evanston IL to forgo the use of plastic bags. Students in the DC area are consulting with Teach for America at a low-income Washington D.C high school, and at ASU, they are working to develop a hydroponic garden to build a more sustainable university community. Some of the ideas you read here will make their way into state and local government offices or become part of a federal discussion while others may become initiatives through partnerships. We are proud to showcase our students' ideas and we hope that you feel inspired to join in their efforts.

Tarsi Dunlop  
Director of Operations

# STRATEGIST'S NOTE



Almost two years ago on a hot summer day in Hyde Park, New York, the small town where Franklin D. Roosevelt was raised and lived throughout his life, I sat with students beneath the shade of an oak tree and introduced myself as the Energy and Environment policy strategist with the Roosevelt Campus Network. I described a modest vision for the coming semester with the level-headed pragmatism of someone who had never dealt extensively with Roosevelters beyond those in his small chapter. Of course, I thought that some ideas from these motivated students would come to me like the fabulous ideas I'd poured over in the 2009 10 Ideas series. Still, I never imagined receiving the response that I did.

It only took a few weeks on the job to learn that the bar that I had set in Hyde Park would be too low. Intensely motivated students, I soon discovered, make up the overwhelming majority of the Campus Network. Ideas weren't just run past me; they were presented to me formally, over the phone and Internet. They were almost always backed by solid evidence and sometimes endorsed personally by scholars whose work I had read in textbooks.

The ideas speak for themselves. I cannot recall giving last year's edition of 10 Ideas to a stakeholder, a policymaker, or a representative from a partner organization whose mouth did not drop upon turning the pages. I anticipate that the ideas in this journal will be received in much the same way. From an urban density incentive to an ecosystem approach to pest management, these ideas are representative of, and will in fact influence, the Millennial Generation's priorities for a greener future.

In April, we asked student authors, most of whom are published in this journal, to present their ideas at Arizona State University before a panel of expert organizers, green entrepreneurs, urban planners, and policymakers. Their presentations were met with a great deal of praise, and even a few offers to collaborate on the ideas' implementation. Though impressed, I will not pretend I am surprised. Just as I have discovered the motivation and intellect of my peers over the course of the past two years, those outside of our community are starting to follow suit.

This just goes to show what I learned long ago: Roosevelters are not just the policymakers, teachers, or lawyers of tomorrow. They are also the policy pioneers of today. I look forward to seeing these stellar ideas acted upon as we move closer to the world that our generation wants to inherit. I am proud to have worked with such interesting, passionate, and energized students during my time as policy strategist, and I sleep a bit more soundly knowing that the future is in the hands of such capable and thoughtful individuals.

David Weinberger  
Lead Strategist, Energy & Environment

# BEDBUGS BEWARE

JOANNA C. LAINE, UNIVERSITY OF CHICAGO

*To quell the city's rising bedbug problem, protect tenants' rights, and prevent the unnecessary use of pesticides, Chicago should require landlords to hire licensed pest-control professionals to inspect and exterminate bedbug infestations.*

Bedbugs were once believed to be nearly extinct, but in recent years they have begun to infest cities at dramatic rates.<sup>1</sup> Bedbug infestations are spreading partly because bedbugs have grown increasingly resistant to pesticides.<sup>2</sup> However, a strategy called Integrated Pest Management (IPM) can be effective at combating bedbugs. Since 1972, the Environmental Protection Agency has recommended that exterminators use IPM whenever possible because it minimizes the use of pesticides.<sup>3</sup> Licensed pest-control professionals in Chicago, who are certified by the Illinois Department of Agriculture, often use IPM to combat bedbugs.<sup>4</sup>

Landlords are sometimes reluctant to spend money on pest-control professionals when their tenants encounter bedbugs. According to the Metropolitan Tenants Organization, some landlords respond to a bedbug problem solely by spraying pesticides.<sup>5</sup> This amateur method does not eliminate infestations and may have dangerous consequences.<sup>6</sup> Pesticide misuse causes health problems for tenants, especially young children. It also contributes to long-term water contamination and the demise of important insect species.<sup>7</sup> To protect the environment and prevent the spread of bedbugs, Chicago should pass a code requiring landlords to use licensed pest-control professionals to inspect tenants' apartments when they report an infestation.

## ANALYSIS

The National Pest Management Association reports that \$258 million was spent on bedbug control in the United States in 2009.<sup>8</sup> A bedbug infestation in a one- to two-bedroom apartment costs between \$200 and \$1000 for the first extermination visit; larger structures could cost up to \$50,000 to exterminate.<sup>9</sup> Bedbugs are detrimental to the Chicago tourism industry, since many people fear picking up bedbugs when they travel.<sup>10</sup> They also lead directly to health problems such as skin irritation, anxiety, and insomnia.<sup>11</sup> Bedbugs travel through walls and cling to furniture and clothing, so rental housing with multiple units enables rapid infestation.

Currently, landlords are required by the Chicago Residential Landlord and Tenant Ordinance (RLTO) to address a pest or repair problem within two weeks of receiving a written notice of the problem from a tenant.<sup>12</sup> However, the current law does not prevent landlords from trying to treat the problem themselves by spraying household pesticides. As a result, the Chicago Department of Buildings has seen an increase in bedbug-related calls to its 311 building-inspection hotline from tenants who lament that their land-

## KEY FACTS

- Chicago is the fifth-most bedbug-infested city in the U.S. according to Terminix.<sup>17</sup>
- Bedbug infestations are rapidly expanding; New York City recorded 4600 infestations in 2006 compared with just 79 infestations two years earlier.<sup>18</sup>
- Bedbugs evolve to be resistant to pesticides. The bedbug problem will continue to grow unless alternative pest management strategies are used.<sup>19</sup>

lords have failed to eliminate bedbug infestations.<sup>13</sup> Amateur pesticide use will not eradicate a bedbug infestation because bedbugs are resistant to many pesticides and are capable of moving to avoid the pesticides. Therefore, the Chicago City Council should pass a code requiring landlords to hire licensed pest-control professionals when multiple tenants in their building report a bedbug infestation. Licensed pest-control professionals are experienced in IPM and can assess a bedbug infestation to determine what treatments are necessary to contain the infestation.<sup>14</sup> They will also educate tenants and landlords about helping contain the spread of bedbugs.<sup>15</sup>

## TALKING POINTS

- Pesticide misuse poses health risks, contaminates the environment, and fails to eradicate bedbugs.
- Integrated Pest Management (IPM) strategies contribute to an overall reduced use of pesticides, enhancing human health and environmental sustainability.

## NEXT STEPS

This code can be passed immediately because the City of Chicago already has mechanisms in place to enforce it. According to the RLTO, if a landlord fails to maintain a unit appropriately, tenants may send the landlord a 14-day written notice of the problem(s) in the apartment. If the landlord fails to address the described problems, a tenant is legally permitted to use one of several remedies against the landlord, depending on the severity and nature of the issue.<sup>16</sup> Once this new ordinance is passed, Chicago should partner with nonprofit organizations such as The Safer Pest Control Project and the Metropolitan Tenants Organization, which are already doing bedbug-related outreach, to publicize the new requirement that landlords must hire a licensed pest-control professional for bedbug extermination. By passing this code, Chicago will make great strides towards eradicating the bedbug problem and protecting the environment.

## ENDNOTES

1. L.J. Pinto, R. Cooper, and S.K. Kraft, *Bed Bug Handbook: The Complete Guide to Bed Bugs and their Control* (Mechanicsville, Maryland: Pinto and Associates, Inc., 2007), 27-33.
2. Alvaro Romero, Michael F. Potter, Daniel F. Potter, and Kenneth A. Haynes, "Insecticide Resistance in the Bed Bug: A Factor in the Pest's Sudden Resurgence?" in *Rapid Communication* (Lexington, Kentucky: Department of Entomology, University of Kentucky, 2006). [http://www.thermal-remediation.com/users/thermal\\_remediation/files/Insecticide%20Resistance%20in%20the%20Bed%20Bug%20-%20A%20Factor%20in%20the%20Pests%20Sudden%20Resurgence.pdf](http://www.thermal-remediation.com/users/thermal_remediation/files/Insecticide%20Resistance%20in%20the%20Bed%20Bug%20-%20A%20Factor%20in%20the%20Pests%20Sudden%20Resurgence.pdf) (accessed April 13, 2011).
3. United States Environmental Protection Agency, "Integrated Pest Management (IPM) Principles," February 16, 2011. <http://www.epa.gov/pesticides/factsheets/ipm.htm> (accessed April 14, 2011).
4. Illinois Department of Agriculture, "Commercial Pesticide Training and Testing," 2001. <http://www.agr.state.il.us/Environment/Pesticide/training/commppl.html>
5. Metropolitan Tenants Organization, "When Bedbugs Attack," January 12, 2011, <http://www.tenants-rights.org/when-bed-bugs-attack/> (accessed April 24, 2011).
6. Pinto, Kooper, Kraft, *Bed Bug Handbook*, 75-76.
7. Statewide Integrated Pest Management Program, "Pesticides: Safe and Effective Use in the Home and Landscape," University of California, April 2006. <http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74126.html> (accessed February 25, 2010).
8. Editorials, "Bedbug U." *The Chicago Tribune*, September 20, 2010. <http://www.chicagotribune.com/news/opinion/editorials/ct-edit-bed-bugs-20100920.0.5737391.story> (accessed February 25, 2011).
9. Pinto, Kooper, Kraft, *Bed Bug Handbook*, 32-33.
10. Ibid. 75-76.
11. Pamela Dittmer McKuen, "Don't Let the Bedbugs Bite Your Association," *The Chicago Tribune*, January 28, 2011. <http://www.chicagotribune.com/classified/realestate/ct-home-0128-condo-living-2010128.0.3433054.story> (accessed February 25, 2011).
12. Office of the City Clerk, "Municipal Code of Chicago, Title 5, Chapter 12, Residential Landlords and Tenants," City of Chicago, <http://www.chicagocityclerk.com/tenants/VRSLandlords.php> (accessed April 24, 2011).
13. Ellen Gabler, "Chicago's Bedbugs Leap into Offices," *The Seattle Times*, November 7, 2010. <http://seattletimes.nwsource.com/html/health/2013348528.webbugs08.html> (accessed March 16, 2011).
14. Ibid. 75-76.
15. Dr. Jody Gangloff-Kaufmann and Jill Shultz. 2003. "Bed Bugs Are Back: an IPM answer". New York State Integrated Pest Management Program, Cornell Cooperative Extension, Cornell University. [http://www.nysipm.cornell.edu/publications/bed\\_bugs/files/bed\\_bug.pdf](http://www.nysipm.cornell.edu/publications/bed_bugs/files/bed_bug.pdf) (accessed April 24, 2011).
16. Office of the City Clerk, "Municipal Code of Chicago, Title 5, Chapter 12, Residential Landlords and Tenants."
17. Pamela Dittmer McKuen, "Don't Let the Bedbugs Bite Your Association."
18. Pinto, Kooper, Kraft, *Bed Bug Handbook*, 75-76.
19. Romero, Potter, Potter, Haynes, "Insecticide Resistance in the Bed Bug."

# THE KILL-A-WATT ENERGY CHALLENGE

CHRIS CASTRO AND SAMANTHA RUIZ, UNIVERSITY OF CENTRAL FLORIDA

*Using the Kill-A-Watt challenge to encourage energy conservation and increase investments in renewable energy sources, Americans can build a more secure future for generations to come.*

The challenges that we face today regarding the climate and our environment are largely due to our personal consumption of energy and our overall environmental footprints. However, energy conservation in residential sectors has become more widely recognized as a method to reduce the consumption of fossil fuels, improve the environment, and make a little money on the side. Since 2010, over 69 percent of the electricity used to power our buildings has been generated from coal, oil, and natural gas-fired power plants – point sources emitting endless amounts of heat-trapping gases that cause catastrophic, climate-altering events across the world.<sup>1</sup> The Kill-a-Watt Energy Competition focuses on reducing the energy consumption of U.S. buildings, which consume 72 percent of electricity produced and 55 percent of U.S. natural gas used.<sup>2</sup> Buildings account for about 40 percent of total U.S. greenhouse gas (GHG) emissions, costing over \$350 billion per year. Reducing GHG emissions associated with buildings is essential to reducing overall U.S. and global emissions.

Kill-a-Watt is an idea developed by the Department of Sustainability and Energy Management at the University of Central Florida (UCF).<sup>3</sup> The energy challenge encourages on-campus residents and campus buildings to compete against other students and faculty in buildings of similar sizes to reduce their energy consumption by the greatest percentage. The savings are determined by comparing the monthly consumption to the baseline average of that building's energy consumption from previous years.

## KEY FACTS

- In the U.S., 69% of electricity is generated from fossil fuels.
- Buildings account for 40% of U.S. GHG emissions and overall energy consumption.
- Buildings use \$350 billion per year in energy costs.

At UCF, the Kill-a-Watt Energy Challenge has been successful for five consecutive years and continually receives campus and community support. In 2010, the initiative saw some incredible results after implementing a new idea: Educational seminars in the residence halls focused on educating students about energy conservation and the types of behaviors that would be conducive to collectively saving energy in the dorms. In the two-month competition during the spring 2010 semester, UCF students saved over 441,000 kWh of electricity and close to \$41,260 in energy savings.<sup>4</sup> Although all the buildings showed signs of positive energy savings, there were four residence halls that achieved greater than 30 percent energy reduction, the highest being 34 percent. After analyzing the Kill-a-Watt Challenge figures, we estimated that students on campus saved enough energy to power 350 homes for one month and avoided nearly 342 tons of CO<sub>2</sub> emissions.

## ANALYSIS

The financial benefit of implementing Kill-a-Watt far outweighs the investments needed to host the challenge. At UCF, the Student Government Association allocated \$6000 for

scholarship incentives. Students participated in weekly educational seminars, answering questions about energy conservation and winning small financial rewards for participating in the competition. Donations from local businesses and companies for the seminars would further incentivize students to participate. Comparing the \$6000 initial investment from the Student Government Association with the \$41,260 in cost savings, the program recouped its expenses in the first two weeks and saw savings of six times the investment by the end of the competition. All in all, throughout the five years at UCF, Kill-a-Watt has helped to save over \$145,940 for the university.

Many universities have successfully implemented similar programs across the nation, including the expansion of water and waste competitions, but have not made significant efforts to expand the competitions to a citywide or countywide level. There is also great potential to engage multiple universities in a single competition during the course of a given semester or other timeframe. Since November 2009, Intellectual Decisions on Environmental Awareness Solutions (IDEAS) has been working with the Orange County Environmental Protection Division (EPD) in central Florida to expand this idea, implement it on a countywide level, and establish a lasting program that will reduce energy consumption by at least 10 percent by 2015.<sup>5</sup>

#### KILL-A-WATT AT UFC

- In 2009, UCF students helped save enough energy to power 350 homes for one month and nearly 342 tons of CO<sub>2</sub> emissions were avoided.
- UCF has saved an estimated \$145,940 in energy costs in five years.
- UCF was nationally recognized by the White House and Steven Chu, the Secretary of the U.S. Department of Energy, for its efforts in energy conservation.

#### NEXT STEPS

Universities should create transparent partnerships with community organizations and local government to host a successful Kill-a-Watt Energy Challenge. The energy management system or utility provider should offer building data and provide guidance when analyzing the reports. The public housing authorities can also provide participants and buildings to join the challenge, while student governments and other community organizations could help gather financial incentives. By encouraging resource conservation through friendly competition, promoting educational outreach, and encouraging others to save money by conserving energy, we can build a more sustainable future for our country and our world.

#### ENDNOTES

1. Energy Information Administration (EIA). Feb 2011, *Electric Power Monthly*. [http://www.eia.doe.gov/cneaf/electricity/epm/epm\\_sum.html](http://www.eia.doe.gov/cneaf/electricity/epm/epm_sum.html)
2. Lawrence Berkeley National Lab (LBNL). News Center, Buildings. <http://newscenter.lbl.gov/feature-stories/2009/06/02/working-toward-the-very-low-energy-consumption-building-of-the-future/>
3. Department of Sustainability & Energy Management, UCF. <http://sustainable.ucf.edu/killawatt>
4. UCF Kill-a-Watt Results. Spring 2010. <http://www.sustainable.ucf.edu/?q=node/120>
5. Orange County Environmental Protection Division. Kilowatt Crackdown. <http://www.kwcrackdown.com/>

# IMPROVE ACCOUNTING CONVENTIONS TO SPUR BUILDING RETROFITS

SOPHIA ROGERS, BARNARD COLLEGE OF COLUMBIA UNIVERSITY

*In order to retrofit buildings for better energy efficiency while protecting their bond ratings and keeping their balance sheets in order, cities can enter the savings from current energy costs as “accounts receivable.”*

Retrofitting technology, which modifies buildings to improve their energy efficiency, has enormous potential for energy savings for families and governments but is vastly under-used by building owners. The Obama administration recognizes that a national effort to encourage energy retrofits provides a great synergy between job creation and environmental sustainability, but the American Recovery and Reinvestment Act (through the Green Retrofit Workforce Program) only included limited funds for retrofitting. The administration, however, can extend its role in retrofitting major cities across the country if it allies with unions and political organizations with an interest in enforcing decent working standards.

Encouraging private building owners to retrofit out of pocket is another option, which the administration has recently promoted with the Better Buildings Initiative of 2011, a set of tax-credit incentives and loan guarantees that aims to increase energy efficiency in commercial buildings.<sup>1</sup> This market-centered approach is a step forward for building energy efficiency because it encourages investment in retrofits as well as green construction of new buildings.

## KEY FACTS

- Commercial and residential buildings together account for two-fifths of domestic energy consumption in the U.S.
- Buildings take up a greater share of domestic energy consumption than transportation and industry.
- Retrofitting technology has enormous potential for energy savings.
- Cities do not currently have the resources to retrofit without loans.

## ANALYSIS

City governments can take it upon themselves to retrofit buildings independent of the federal government's assistance and/or funding. But barriers, such as limited capital or available capital, lack of clear information, and limited knowledge or commitment of building professionals, have kept cities from retrofitting to their fullest potential. Another problem is that a wide range of participants, all with different interests, must coordinate successfully in order for retrofitting to work.<sup>2</sup> While the Better Buildings Initiative sets up competitive grants for state and local governments that initiate retrofitting, this delayed-reward program does not address cities' lack of available capital, the major obstacle to retrofitting.

## NEXT STEPS

The power to enable retrofitting at the state and city level lies with the Governmental Accounting Standards Board, the organization that the Securities and Exchange Commission endorses to set accounting standards for state and local governments. In order for retrofitting to become standard practice, the Governmental Accounting Standards

Board should issue a clarification on how cities can book the initial debt required to undertake retrofitting. Further, the Department of Energy, the White House Office of Public Engagement and Intergovernmental Affairs, and Senate leaders should use their influence to send the message to cities and state governments that they need to start retrofitting, and that they can do so by booking their debt against their future savings. Encouraging cities to borrow against future savings will help overcome the capital barrier, freeing up the market to retrofit buildings for energy efficiency.

#### TALKING POINTS

- At a time when 15 million Americans are currently under- or unemployed, retrofitting buildings on a large scale will create hundreds of thousands of jobs. The Green Jobs New York bill of 2009 created 60,000 jobs for retrofitting in New York alone.<sup>3</sup>
- Banks will be willing to lend to cities that are implementing projects to retrofit buildings because energy savings are substantial and guaranteed in the long term.
- Other policy options, mainly carbon taxing and cap-and-trade, are a start to tackling the issue of climate change, but insufficient on their own in terms of creating jobs.

#### ENDNOTES

1. "CRE Industry Groups Support Obama 'Better Building' Plan; Say It Will Create Jobs, Spur Green Investment," last modified February 9, 2011 [http://www.costar.com/News/Article/CRE-Industry-Groups-Support-Obama-Better-Building-Plan;-Say-It-Will-CREATE-Jobs-Spur-Green-Investment/126318&src=rss](http://www.costar.com/News/Article/CRE-Industry-Groups-Support-Obama-Better-Building-Plan;-Say-It-Will-CREATE-Jobs-Spur-Green-Investment/126318?ref=/News/Article/CRE-Industry-Groups-Support-Obama-Better-Building-Plan;-Say-It-Will-CREATE-Jobs-Spur-Green-Investment/126318&src=rss).
2. Price, Lynn and Ernst Worrell, "Barriers to Greater Energy Efficiency within the Building Industry" American Council for an Energy-Efficient Economy (2011): 2.
3. "Executive Summary." Environmental Protection Agency's *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2008*: 8.

# SMART GRID DEPLOYMENT PLANS FOR FLORIDA'S UTILITIES

LANCE LEGEL AND MATTHEW FELDMAN, UNIVERSITY OF FLORIDA

To save money, create jobs, improve performance, and reduce pollution from Florida's energy systems, legislators should require Florida's utilities to develop smart grid deployment plans.

People throughout the U.S. can use smart grids to cut their energy consumption by 15 percent using digital technologies, but such investments would be particularly useful in Florida.<sup>1,2</sup> Floridians could use them to save \$6 billion per year by 2020 and enjoy 16,000 new jobs.<sup>3,4</sup> Power outages cost Florida an estimated 5 to 8 billion dollars per year in lost productivity, but smart grids can help recoup these costs through integrated sensors, software, and computer networks that increase reliability.<sup>5,6</sup>

## KEY FACTS

- Smart grids could save Florida \$6 billion per year by 2020.<sup>14</sup>
- Smart grids could cut Florida's energy use by 15 percent and pollution by 12 percent.<sup>15,16</sup>

Smart grids bridge energy supply and demand through information technologies. They cut pollution by 12 percent through decreased energy production.<sup>7</sup> Utility companies need them to integrate random and decentralized clean energy sources. In fact, according to *The Economist*, smart systems "may well be humankind's best hope for dealing with... global warming."<sup>8</sup> Seven utility companies in Florida committed \$449 million to smart grid deployment in 2009, earning \$262 million in federal grants.<sup>9</sup> Meanwhile, California enacted a law requiring all major utility companies to develop smart grid deployment plans.<sup>10</sup> Millions of Floridians would benefit from a similar law.

## ANALYSIS

Florida has especially serious energy problems; its per capita residential electricity demand is among the highest in the country, due in part to high air-conditioning use during the hot summer months and the widespread use of electricity for home heating during the winter months.<sup>11</sup> Florida also has a particularly ugly history of hurricanes and severe storms that cause extremely expensive power outages during the fall months.

The state's energy needs have not gone unnoticed, and Florida is "one of the most aggressive smart grid states in the nation" because of federal and private investments.<sup>12</sup> But because some of Florida's private utility companies are able to profit from the state's relatively high level of energy use, they may never deploy a smart grid system that would reduce consumer revenues. Given these circumstances, a light regulatory push is required.

## NEXT STEPS

To seize the opportunities outlined above, the Florida legislature should require utility regulators and every major utility company to develop a smart grid deployment plan over a two-year timeline. This is a nonpartisan plan, but there will be significant political obstacles to passing it. First, many utility company shareholders are now opposed to

smart grid deployment because it demands large capital investments that don't translate into high marginal returns in the short term. Second, many Florida regulators will be hesitant to embrace this plan because they are keenly aware of poorly managed smart grid projects around the nation. Third, polls show that over one in five Americans do not currently want smart grids.<sup>13</sup> Opponents will mostly claim that the costs of smart grids are not worth the prospective benefits, but they are incorrect. Legislators will find support from the clear majority of voters, as well as influential constituencies like nonprofit organizations, policy and economic research institutions, and forward-looking industry leaders.

### TALKING POINTS

- Smart grids would save Floridians money and decrease power outages.<sup>17</sup>
- Smart grids will give new insights and controls through digital technologies.<sup>18</sup>
- Smart grids increase utility operational efficiency, reduce outages from hurricanes, and create new markets with improved energy services.<sup>19</sup>

Mechanically, the law would require smart grid deployment plans to improve the overall efficiency, reliability, and cost-effectiveness of electrical system operations, planning, and maintenance. Annual reports on the progress of deployment efforts would be made public, including detailed cost-benefit analyses. To move forward, interested legislators should seek professional consultation on how best to optimize this policy for Florida's existing regulatory and political structure.

### ENDNOTES

1. IBM. IBM and Consert Help North Carolinians Reduce Energy Consumption With Smart Grid Technology. 2009. (<http://bit.ly/ibm-smart-grid>).
2. CNT Energy. Illinois Households Save on Electricity Bills with Power Smart Pricing. 2011. (<http://bit.ly/ameren-smart-grid>).
3. McKinsey & Company. McKinsey on Smart Grid. 2010. (<http://bit.ly/mckinsey-on-smart-grid>).
4. KEMA. The US Smart Grid Revolution: KEMA's Perspectives for Job Creation. 2008. (<http://bit.ly/kema-smart-grid-jobs>).
5. CEIDS. The Cost of Power Disturbances to Industrial & Digital Economy Companies. 2001. (<http://bit.ly/cost-of-power-disturbances>).
6. US Department of Energy. The Smart Grid: An Introduction. 2008. (<http://usa.gov/doe-smart-grid-introduction>).
7. Pacific Northwest National Laboratory. The Smart Grid: An Estimation of the Energy and CO<sub>2</sub> Benefits. 2010. (<http://bit.ly/smarty-grid-co2s>).
8. The Economist. It's a Smart World: Special Report on Smart Systems. 2010. (<http://econ.st/smart-systems-report>).
9. US Department of Energy. Recovery Act Selections for Smart Grid Investment Grant Awards. 2009. (<http://usa.gov/recovery-act-smart-grid>).
10. CA Public Utilities Code, Chapter 4, Section 8360-8369. (<http://bit.ly/ca-smart-grid-law>).
11. Galvin Electricity Initiative. Smart Grid Issues in State Law and Regulation. 2010. (<http://bit.ly/smart-grid-laws-regulations>).
12. US Energy Information Administration. State/Territory Energy Profiles. 2010. (<http://bit.ly/eia-florida-energy-profile>).
13. Harris Interactive. Consumers Have Little Awareness of Smart Grid and Smart Meters. 2010. (<http://bit.ly/consumer-awareness-smart-grid>).
14. McKinsey & Company. McKinsey on Smart Grid.
15. IBM. IBM and Consert Help North Carolinians Reduce Energy Consumption With Smart Grid Technology.
16. Pacific Northwest National Laboratory. The Smart Grid: An Estimation of the Energy and CO<sub>2</sub> Benefits.
17. US Department of Energy. The Smart Grid: An Introduction. 2008.
18. Ibid.
19. Ibid.

# AMENDING THE NEW YORK STATE FINANCE LAW

JAMES UNDERBERG, CORNELL UNIVERSITY

*By amending the State Finance Law, New York State could authorize state agencies and municipalities to consider environmental and labor-related external costs when choosing a bidder for a commodity or service contract.*

Between January 2009 and January 2010, New York State agencies spent \$26.5 billion on contracts to private companies covering everything from infrastructure and construction to janitorial services.<sup>1</sup> The New York State Finance Law regulates local bidding processes and establishes vague restrictions on how state agencies and municipalities can award these contracts. Among its many stipulations, the law requires that contracts “be awarded on the basis of lowest price to a responsive and responsible offerer.” This law, by committing the state to the lowest bidder, effectively prohibits the state from considering long-term environmental, health , or labor-related costs when deciding how to spend taxpayer money.

## KEY FACTS

- New York State agencies spend almost \$30 billion a year on contracts to private companies.
- Municipalities and agencies are forced to accept the contract from the lowest financially stable bidder, regardless of that company’s environmental or labor practices.

The law defines a “responsible offerer” as one with “the financial ability, legal capacity, integrity and past performance of a business entity and as such terms have been interpreted relative to public procurements.”<sup>2</sup> As long as a supplier can financially and legally fulfill the contract, the municipality must accept its bid. This narrow definition does not allow a state agency or municipality to consider environmental or labor standards when defining “responsible.” The law does specify certain exceptions to the rule, in which state agencies can consider social concerns when choosing contracts; for example, the State University of New York and community colleges can classify a sports equipment or apparel manufacturer as “not responsible” based on labor considerations, and state agencies can “give priority to the purchase of motor-vehicles which are mercury-free.”<sup>3,4</sup> The state should extend this freedom to all government agencies and municipalities for any contract.

## ANALYSIS

While opponents of this proposal will claim it will increase costs and deter companies from applying for contracts, recent history suggests otherwise. In 2007, Maryland passed SB 621, which required bidders for service contracts to pay living-wage rates; the number of bids Maryland received for service contracts then increased by 30 percent. The bill leveled the playing field by allowing small businesses that pay living wages to be competitive.<sup>5</sup> Cities and counties across the country have passed more than a hundred similar living wage laws. A study conducted by the Brennan Center at New York University found that, on average, these cities and counties experienced a contract cost increase of only 0.1 percent of the overall local budget.<sup>6</sup> Furthermore, counties that commit to consider environmental concerns often end up saving money, as in King County, Washington, which saved \$550,000 in 2002 by committing to purchase environmentally sustainable products.<sup>7</sup> Yet when five New York municipalities (Albany, Schenectady, New Paltz, Alba-

ny County, and Suffolk County) tried to pass legislation committing to purchase uniforms from suppliers that meet certain environmental and labor standards, lawmakers in each case had to add preclusion clauses that delay the policy's implementation until the New York State legislature changes its Finance Law. The state should not force municipalities to spend taxpayer dollars to support unfair labor practices or environmental destruction for the sake of short-term financial gain. Indeed, New York State itself has made this "sweat-free" commitment for its purchases. If the state can commit to supporting companies that practice fair labor and environmental practices, its municipalities should certainly have the same right.

## NEXT STEPS

Given that the Finance Law's wording has prevented municipalities from committing to labor-friendly and environmentally conscious purchases, it should be amended. One possible solution would be to amend Section 163, clause 1c to allow municipalities and agencies to expand the definition of "responsible offerer": *"Individual municipalities may amend the definition of 'responsible' to set additional minimum environmental and/or labor standards."* This amendment would immediately fulfill the requirements of the procurement clauses in existing legislation throughout the state and open the door for future commitments from other municipalities. While an ideal solution might articulate specific statewide minimum environmental and labor standards for contracts, such an amendment would be unlikely to pass. Allowing municipalities to set their own standards makes the amendment realistic. On a macro level, this policy will promote companies that reduce their environmental footprint, which in turn will reduce pollution and foster healthier communities. It will also benefit companies that treat their workers fairly, which will help stimulate the economy and counteract brain drain, an especially important concern in upstate New York.

Across the country, state and local governments are changing contract policies to incentivize social and environmental responsibility. Given that the history of these policies shows them to have negligible budgetary consequences, New York State should allow municipalities to set their own definitions of "responsible." It is time for New York State to give municipalities the freedom to decide whether they want to reward companies that champion labor and environmental causes, or those that ignore them.

## ENDNOTES

1. United States. New York State. Office of the State Comptroller. Open Book New York. Office of the State Comptroller. Web. 11 Oct. 2010.
2. NYS Finance Law, Article XI § 163, 3a (ii)
3. Ibid. § 163, 1c
4. Ibid. § 165, 7
5. Ibid. § 165, 8
6. Elmore, Andrew J. *Living Wage Laws & Communities: Smarter Economic Development, Lower Than Expected Costs*. Rep. New York: Brennan Center for Justice, NYU School of Law, 2003. 11 Oct. 2010. Web. <[www.nelp.org/page/-/EJP/elmore\\_summary.pdf](http://www.nelp.org/page/-/EJP/elmore_summary.pdf)>.
7. Rubenstein, Michael C. *Impact of the Maryland Living Wage*. Annapolis: Library and Information Services Office of Policy Analysis Department of Legislative Services, 2008. Department of Legislative Services. Web. 11 Oct. 2010. <[www.chamberactionnetwork.com/documents/LivingWage.pdf](http://www.chamberactionnetwork.com/documents/LivingWage.pdf)>.
8. Lidel, Beth. *Environmentally Preferable Purchasing (EPP) Programs and Strategies: Integrating Environmental and Social Factors into Procurement Practices*. Seattle: Pacific NW Pollution Prevention Resource Center, 2003. 4 April 2011. Web. <[http://www.pprc.org/pubs/epp/epp\\_programs\\_and\\_strategies.pdf](http://www.pprc.org/pubs/epp/epp_programs_and_strategies.pdf)>.

## TALKING POINTS

- Five municipalities have committed to buy apparel from "sweat-free" suppliers, but have had to delay implementation until the Finance Law is amended.
- Allowing municipalities to set minimum environmental and labor standards will not only benefit the environment and the global workforce, but also law-abiding local businesses.

# LOCAL FOOD IN PUBLIC INSTITUTION MEALS

CHRISTOPHER BATSON, MIDDLEBURY COLLEGE

*Federal and state governments should facilitate the purchase of local food by public institutions in order to help stimulate local economies and reduce greenhouse-gas emissions.*

The United States Department of Agriculture (USDA) is the primary manager of the commodity food program in the United States, which is responsible for taking surplus products off the market to go to the military, the needy, and public schools.<sup>1</sup> Funds given to each state by the Department of Defense are used by public institutions to purchase food from the USDA program and provide meals for school lunches, public hospitals, and so on. The food-product distributors are determined through a bid process that is overseen by the Department of Defense. The highest bidder gains a regional contract to distribute the commodities purchased with Department of Defense funds and funneled through the USDA. States are restricted to buying solely within the USDA commodity program.<sup>2</sup>

## KEY FACTS

- Certification for the commodity food program can cost up to \$1000 per year.<sup>8</sup>
- Neither the federal nor state government helps to offset the costs of these certifications.<sup>9</sup>

The USDA often issues large contracts that can only reasonably be filled by large farms. These contracts thus exclude small-scale farmers, who do not have the resources to fulfill such large demands. This exclusion limits the economic and job opportunities of smaller farms and communities, who lack the land resources and capital needed for such growing capacities. However, many “Farm to School” programs have been developed in states like California, New York and North Carolina, to supplement the purchases provided by the Department of Defense. This process works by market testing various products offered within the state via the state’s department of agriculture. Thus, the funds for purchasing these more localized products are created through an economic-research waiver.<sup>3</sup> All states should be given the opportunity to use such a waiver to purchase local foods, and/or to facilitate the certification of in-state farms for the USDA program. These measures are necessary to stimulate job growth and improve the economies of smaller farming communities.

## ANALYSIS

Current Farm to School programs work to increase the number of local – and more importantly, fresh – foods found in public schools. These programs stimulate in-state economies, create jobs, and increase the flow of community capital, as well as reducing transportation and energy costs from reduced fossil-fuel consumption. The farm-certification process is a hurdle faced by many small New England farms in particular. To become a viable candidate for food purchase they are required to have Good Agricultural Practices and Good Handling Practices certifications, otherwise known as “GAP” and “GHP” certifications. Produce buyers often require these certifications to ensure the quality of products. However, for most small farmers these certifications are lengthy and costly.<sup>4</sup> Neither the government nor many state governments offer assistance in these certifications, and in addition to the long wait period and initial cost of the third-party inspection,

certification can cost up to \$1000 per year.<sup>5</sup> These factors often inhibit small farms from being certified and establishing their candidacy for the USDA commodity system. State and federal offsets for smaller farms, or more liberal purchasing powers among state and local public institutions, would enable local institutions to purchase from smaller, local farms without certifications. Alternatively, legislation could facilitate and expedite the certification process for small farms and likewise enable local purchase.

## NEXT STEPS

Federal and state governments need to modify the commodity food system to grant waivers for local food purchase and/or lower the costs of GAP and GHP certifications. This legislation should work off of the amendment proposed by Representative Pingree of Maine for the Richard B. Russell National School Lunch Act.<sup>6</sup> This amendment would create a local-food credit program, which would allow schools to use up to 10 percent of their Department of Defense funds on local foods for consumption in the state's public-school system. Certification assistance programs could be modeled after those in New York, North Carolina, and Texas. Such amendments to the commodity system would be the first of many steps towards increased in-state economic growth. These waivers would result in smaller contracts, which would allow smaller farms to realistically participate in the commodity system. Furthermore, the supply of local food would reduce transportation costs and greenhouse gas emissions incurred by regional distribution centers, which often force an institution to purchase a product offered within the state from an out-of-state supplier.<sup>7</sup>

### TALKING POINTS

- No waivers exist for public institutions to purchase food outside of the USDA commodity food program.
- The National School Lunch Act would allow up to 10 percent of Department of Defense funds to be used for the purchase of local foods.<sup>10</sup>
- Modification of the FDA commodity system would reduce transportation costs and emissions, as well as stimulate local farms and produce jobs.

With the passing of such acts as the National School Lunch Act, there would be increased access to local fresh produce among public-school children. This would stimulate local farm economies all over the country and increase the health of public-institution users and participants. Lowering the costs of GAP and GHP certifications would allow more farms to participate in said fresh-produce programs, in addition to the USDA commodity program that already exists. For all communities involved, these changes would result in increased income and jobs, as well as a decrease in carbon emissions released in the transportation of goods.

## ENDNOTES

1. USDA Commodity Food Program. *State Processing Handbook* <<http://www.commodityfoods.usda.gov/programs.htm>> Accessed 8 Apr. 2011.
2. Ibid.
3. Farm to School. North Carolina Profile. <<http://www.farmtoschool.org/state/home.php?id=31>> Accessed 8 Apr. 2011.
4. Rejesus, R.M. "Good Agricultural Practices, GAP certification: Is it worth it?". North Carolina State University Cooperative Extension. <<http://www4.ncsu.edu/~rmrejesu/FoodSafety/Risk/ag700%20final%20printed.pdf>> Accessed 12 Jan. 2011.
5. "GAPs: Bringing Good Agricultural Practices to Your Farm." June 2009. Midwest Organic and Sustainable Education Service. <<http://www.mosesorganic.org/attachments/productioninfo/fsgap.html>> Accessed 12 Jan. 2011.
6. H.R. 5806 referred to Committee on Education and Labor
7. USDA Commodity Food Program. *State Processing Handbook*.
8. "GAPs: Bringing Good Agricultural Practices to Your Farm."
9. Ibid.
10. H.R. 5806 referred to Committee on Education and Labor.

# INCREASING URBAN DENSITY VIA A LEED ALTERNATIVE

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*Providing an incentivized alternative to Leadership in Energy and Environmental Design Certification will encourage the United States Green Building Council to alter certification criteria in order to promote increased density.*

Dense urban living is inherently more environmentally sustainable than suburban sprawl due to the benefits of mass transit and reduced land consumption.<sup>1</sup> The aggregate environmental impacts of high population density far exceed the benefits of a single green building. However, Leadership in Energy and Environmental Design (LEED) building certification, the dominant certification system in the United States, neglects the importance of well-planned and dense areas in tandem with sustainable buildings. The LEED certification process essentially fosters “green sprawl.”<sup>2</sup> The system’s formatting, which classifies buildings based on a point system, leads to certification for the sake of the title, and often the cheaper points are located further from city centers due to lower land prices and greater availability.

## KEY FACTS

- In the U.S., land consumption currently grows at three times the population rate.<sup>8</sup>
- LEED policies are found in 45 states, including 442 localities, 35 state governments, and 14 federal agencies.<sup>9</sup>
- Suburban residents drive 31% more than their urban counterparts and consume twice as much land.<sup>10</sup>

Governments with existing laws that mandate or encourage LEED development should offer a green-building certification alternative based solely on building in dense areas. This alternative density certification should satisfy the requirements for any existing LEED mandates or incentives, but it should also encourage dense, transit-oriented development without the cost of United States Green Building Council (USGBC) certification. This alternative should eventually pressure the USGBC to include more “sustainable sites” points in its rating requirements.

The inception of the USGBC and the LEED certification system spawned a green-building revolution in the United States. While the building principles inherent in USGBC’s mission were initially targeted at the private sector, the U.S. General Services Administration soon adopted LEED standards for all government-owned and developed buildings, which dramatically boosted LEED’s credibility and integrity. Today, 28 percent of all LEED buildings are government-owned and operated, making the government a large contributor to the USGBC’s success.<sup>3</sup> Many municipalities encourage LEED by offering increased allowed density through floor-to-area ratios, but no local government currently certifies buildings based solely on sustainable locations.

## ANALYSIS

By 2030, the U.S. will need approximately 427 billion square feet of built space. While 82 billion square feet will be infill, 131 billion will be from new construction.<sup>4</sup> Given the rapid need for new construction and the nation’s already sprawling development, governments should provide a certification system based entirely on population density. This alternative would encourage cities to consider green building in the context of the

existing built environment while still allowing LEED certification as an alternative or supplement. Low-density development and living produces 2.5 times the GHG emissions of high-density development and living on a per-capita basis.<sup>5</sup> Economically speaking, doubling employment density increases worker productivity by 6 percent. Additionally, sprawling development is more costly for local governments, as the cost of providing infrastructure and services is 47 percent more expensive in low-density areas.<sup>6</sup>

Finally, achieving certification through the USGBC can be expensive. A study estimates that USGBC certification accounts for 4-11 percent of the total building costs.<sup>7</sup> The basic cost of certification does not include any of the costs of energy efficiency upgrades. A locally administered density alternative offers a cheaper means of certification with a more environmentally friendly payout. This will ultimately increase urban green building for stakeholders, and increase the government's ability to adhere to slightly more expensive green-building standards due to decreased operating costs. A density-based certification system would encourage the USGBC to better integrate the importance of sustainable sites and transit connectivity in its point system. While the proposed policy will initially serve as an alternative to LEED certification, the ultimate goal is to encourage the USGBC to alter its green building criteria from sprawl-inducing, to location-neutral or density-encouraging.

### TALKING POINTS

- LEED accreditation encourages sprawling development through a point system biased towards new land development.
- Buildings located in dense areas are inherently greener due to more mass-transit options, resulting in reduced transportation-related greenhouse gas and particulate matter emissions.
- In the long run, it will encourage the USGBC to reevaluate its sprawl-inducing standards.

### NEXT STEPS AND IMPLEMENTATION CHALLENGES

In order to encourage dense development, local governments should adopt green building and permitting standards based solely on density. These standards should provide an alternative to existing LEED standards so that certified buildings can reap the same financial incentives included in existing green-building policies. Creating a new density-based standard should be an inexpensive process and should have a low regulatory burden as it is based on only one factor. There are limitations to setting a density standard, as it is difficult to achieve dense development in rural environments. Therefore, LEED will remain the best building certification system for some communities.

### ENDNOTES

1. David Owen, *Green Metropolis: Why Living Smaller, Living Closer, and Driving Less are the Keys to Sustainability* (New York: Riverhead Books, 2009).
2. Park, Eunjung. "The U.S. Federal Green Building Policy." *Sustainable Development Law & Policy* 71 (2009), <http://digitalcommons.wcl.american.edu/cgi/viewcontent.cgi?article=1164&context=sdlp>
3. United States Green Building Council. "Government Resources." 2010. <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1779>
4. Bruce Katz, "Economic and Fiscal Benefits of Density" (presented at Premier's Leaders Forum on Strategic Growth, May 12, 2005)
5. Norman et al., "Comparing High and Low Residential Density: Life-Cycle Analysis of Energy Use and Greenhouse Gas Emissions." *Journal of Urban Planning and Development* (March 2006), [http://www.sbaall.org/uploads/Comparing.High\\_and\\_Low\\_Residential\\_Density\\_Life\\_Cycle\\_Analysis\\_-Energy\\_Use\\_and\\_Greenhouse\\_Gas\\_Emissions.pdf](http://www.sbaall.org/uploads/Comparing.High_and_Low_Residential_Density_Life_Cycle_Analysis_-Energy_Use_and_Greenhouse_Gas_Emissions.pdf)
6. Bruce Katz, "Economic and Fiscal Benefits of Density" (presented at Premier's Leaders Forum on Strategic Growth, May 12, 2005)
7. Northbridge Environmental Management Consultants. "Analyzing the Cost of Obtaining LEED Certification." 2003. [http://www.cleanair-cool-planet.org/for\\_communities/LEED\\_links/AnalyzingtheCostofLEED.pdf](http://www.cleanair-cool-planet.org/for_communities/LEED_links/AnalyzingtheCostofLEED.pdf)
8. United States Green Building Council. "Leadership in Energy and Environmental Design 2009 for Neighborhood Development." 2009. <http://www.usgbc.org>ShowFile.aspx?DocumentID=8880>
9. United States Green Building Council. "Government Resources." 2010. <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1779>
10. Matthew E. Kahn, "The Environmental Impact of Suburbanization," *Journal of Policy Analysis and Management* 19, no. 4 (2000), [http://www.nbwctp.org/resources/the\\_environmental\\_impact\\_of\\_suburbanization.pdf](http://www.nbwctp.org/resources/the_environmental_impact_of_suburbanization.pdf)

# BUILDING A SMARTER GRID

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*To increase the competitiveness of the American economy and catalyze the development of other green industries, the federal government should invest in smart grid infrastructure by targeting businesses.*

In the information age, the digitization of our national communication networks has brought incredible economic growth. In the last several decades, the federal government has poured billions of dollars into developing both telecommunications and cable networks. Yet the national electric grid remains essentially unchanged since the 1950s.

Because of the antiquated state of the U.S. electrical grid, the current infrastructure possesses a number of handicaps that impede progress toward a modern energy economy. On its website, the Department of Energy indicates that the smart grid of the future will have several key characteristics. It will heal itself immediately after power disturbance events. Consumers will be empowered to participate in an energy price market that accounts for the demand, supply, and cost of power. It will provide the necessary digital-quality power that can support computerized and next-generation automated equipment. In addition, this grid will accommodate all types of energy-generating technologies, such as wind and solar power, while capable of storing power for when it is needed most. Finally, this smart grid will be efficient, reliable, secure, and a vital installation for next-century businesses.

## ANALYSIS

Achieving the multiple roles of a fully functioning smart grid concurrently is an imprudent task. Priority should be given to grid upgrades that most immediately yield benefits to the economy. Thus, the first improvements should target improving power quality for U.S. businesses. Every year, the U.S. economy experiences \$80-\$150 billion in business losses from outages and voltage fluctuations.<sup>1</sup> In layman's terms, good power quality means power that will not impair customers' equipment. Bad power quality can be attributed to peaks in consumer demand, which temporarily can cause voltage sags on an aging, overloaded power distribution infrastructure.

Poor power quality also lowers the lifetime of computerized equipment, and while sensitive electronic technologies comprised an insignificant fraction of total U.S. electricity consumption in the 1980s, the current percentage consumption of digital equipment approaches 40 percent and will likely hit 60 percent by 2015.<sup>2</sup> As the load grows higher in coming years, the consequences of poor power quality become increasingly severe. Improving power quality first will establish a platform that enables the other key smart

## KEY FACTS

- Estimates place the price of a smart grid at \$65 billion over the next two decades, less than the annual \$80-\$150 billion in business losses incurred by poor power quality.<sup>3</sup>
- The percentage of total electricity consumption by power-quality-sensitive digital equipment currently approaches 40 percent and will most likely hit 60 percent by the year 2015.<sup>4</sup>
- A voltage sag that lasts less than 0.1 seconds at a glass production plant can cost \$200,000.<sup>5</sup>

grid characteristics to develop. Grid modernization will spur companies to invent new products and services that can complement wind and solar power. Installing self-healing equipment will also improve grid security. Most important, the efficiency gains the grid will experience will play a huge role in lowering carbon emissions while simultaneously stimulating new economic development and increasing American competitiveness.

## NEXT STEPS

In order for the smart grid to gain adequate financial support, taxpayers need to be convinced that the benefits will outweigh the costs. Since power-quality enhancements will make corporations more financially efficient and globally competitive, corporate taxes should be increased to help pay for the smart grid. The National Institute of Standards and Technology should implement stricter standards to compel new smart grid companies to collaborate and synchronize efforts. A smart grid will improve power quality from the utility sector by installing rapid sensing and automated self-healing equipment such as synchrophasors, which instantaneously detect fluctuations in power quality. Efforts also need to be made to increase the number and quality of transmission lines, in order to cut down on congestion in power delivery to industrial sectors.

## ENDNOTES

1. National Energy Technology Laboratory. Modern Grid Benefits. In the Department of Energy Reference Shelf, August 2008. Accessed January 10, 2011. [http://www.netl.doe.gov/smartergrid/referenceshelf/whitepapers/Modern%2520Grid%2520Benefits\\_Final\\_v1\\_0.pdf](http://www.netl.doe.gov/smartergrid/referenceshelf/whitepapers/Modern%2520Grid%2520Benefits_Final_v1_0.pdf).
2. Arness, Clif. "The Future of Power Quality: Addressing Our Aging Power Grid." TENTHML. July 20, 2010. Accessed January 4, 2011. [http://tenthml.com/campaigns/energy/the.future.of.power.quality\\_addressing.our.aging.power.grid](http://tenthml.com/campaigns/energy/the.future.of.power.quality_addressing.our.aging.power.grid).
3. Chameides, Bill. "The New Smart Grid: 21st Century Tech for the 21st Century." Popular Science, February 27, 2009. Accessed February 14, 2011. <http://www.popsci.com/environment/article/2009-02/new-smart-grid-21st-century-tech-21st-century>.
4. Arness, Clif. "The Future of Power Quality: Addressing Our Aging Power Grid."
5. Hall, Chad. "The Importance of Higher Power Quality." ECN Magazine, February 19, 2010. Accessed February 20, 2011. <http://www.ecnmag.com/blog/2010/02/tech-The-Importance-of-Higher-Power-Quality.aspx>.
6. Feist, Christian, Dirk Schlesinger, and Wes Frye. *Smart Grid: The Role of Electricity Infrastructure in Reducing Greenhouse Gas Emissions*. Cisco Internet Business Solutions Group, October 2008. Accessed February 17, 2011. [http://www.cisco.com/web/about/ac79/docs/wp/Utility\\_Smart\\_Grid\\_WP\\_REV1031\\_FINAL.pdf](http://www.cisco.com/web/about/ac79/docs/wp/Utility_Smart_Grid_WP_REV1031_FINAL.pdf).

## TALKING POINTS

- The cost of a voltage interruption is minimal to the homeowner – just a brief dim of the lights – but for a manufacturer it can bring automated factory-floor production to a standstill.
- According to the Department of Energy, a smart grid is crucial to providing the stable infrastructure for electric vehicles and renewable energy.
- Electricity transmitted through the national grid currently accounts for 25 percent of the country's total greenhouse gas emissions.<sup>6</sup>

# A RURAL BANKING SYSTEM: SUSTAINING AMERICA'S SMALL FARMS

LYDIA D. BOWERS, MOUNT HOLYOKE COLLEGE

*Creating a government-supported rural banking system specifically focused on the agricultural community will support American farm innovation.*

At the turn of the 20<sup>th</sup> century, there was a strong network of rural banks that facilitated rural development and agriculture production. Many of these banks failed during the Great Depression, and the current banking industry does not serve the needs of small farmers for many reasons. Most significant among these reasons is that commercial banks cannot work within the time frames of smaller agricultural operations. As most agricultural investments take multiple years to generate profit, longer grace periods are needed before loan repayments begin.

Along with helping reduce debt and bankruptcy, easier access to capital will help small- and medium-scale farmers diversify their crops and adopt environmentally conscientious practices. In recent years, numerous developments in sustainable agriculture have occurred, including hydroponics and zero-tillage farming. However, the startup costs of these technologies are prohibitive to the small- and medium-scale farms most eager to adopt them. The Conservation Loan and Loan Guarantee Program has successfully encouraged sustainable farming practices by providing “direct or guaranteed conservation loans to qualified borrowers” through the USDA’s Farm Service Agency since 2008.<sup>5</sup> There have been successes, but not on a large enough scale.

## ANALYSIS

The rural banking system in America would function similarly to the private banking system, but would be funded and guaranteed by the United States government. Agricultural microcredit would be offered through rural banks, similar to the successful model used in many African and Asian countries. Green Bank, a successful rural bank in the Philippines, doubled the number of loans it dispersed in one year.<sup>6</sup> To mirror this success, rural banks in America could use similar practices, such as loan-repayment conditions determined by the borrower’s capacity to repay.

Independent microfinance projects have also emerged to fill the vacuum of credit for small U.S. agricultural operations, such as the Farm Start program<sup>7</sup> and The Carrot Project.<sup>8</sup> The Carrot Project has extended microcredit to Vermont and Massachusetts farms “to address the difficulty that some New England farmers have in obtaining credit for projects that improve their operations and increase their income, as well as for emergency needs.”<sup>9</sup>

However, companies that provide this credit require that the eligible farms pursue organic practices. It is logical to assume that imple-

## KEY FACTS

- U.S. farms with 50-499 acres declined from 3.9 million in 1935 to about one million in 1997,<sup>1</sup> while farms smaller than 49 acres grew from 1997 through 2007.<sup>2</sup>
- Farm-sector debt is estimated to increase from \$240.3 billion in 2010 to \$241.6 billion in 2011.<sup>3</sup>
- Unified support for small and midsized farms has been implemented through institutionalized credit distributed by rural banks in African and Asian countries.<sup>4</sup>

mentation on a larger scale will continue this trend of success. The funding for this policy could come from the reform of current agriculture subsidies, requiring no additional funds. Furthermore, by administering this credit through a network of public rural banks, the government can better cut down on waste and fraud in the current subsidies program. A recent survey by the New England Organic Farming Association showed that “while there is significant unmet loan demand, most loans would be relatively small and the borrowers very diverse.”<sup>10</sup> It is also important to note that the ability to secure capital has gotten worse during the recent recession. A government-supported rural banking system will serve as a competitor with the commercial banking system, ensuring the best rates for agricultural users.

## NEXT STEPS

There is currently strong support for agricultural and food-policy reform both among the government and the American public. The U.S. farm bill, which is passed every five years and will next be revised in 2012, presents a prime opportunity to address this need for a rural banking infrastructure. It could be incorporated into a larger reform of farm subsidies. However, further research on the creation and implementation of a rural banking system is needed before this policy can be actualized. A secondary version of this policy would be government support of pre-existing banks that focus on agriculture.

### TALKING POINTS

- The U.S. must create avenues for small farms to access capital to develop and invest in new technology.
- At a time when the general public is questioning the security of our national food system, strengthening this integral part of a secure food system is crucial.
- The upcoming U.S. farm bill in 2012 will be a prime opportunity to reassess the way the United States government provides funds to small and medium-scale farms.

## ENDNOTES

1. “Agriculture Fact Book 2001-2002.” United States Department of Agriculture. [www.usda.gov/factbook/2002factbook.pdf](http://www.usda.gov/factbook/2002factbook.pdf) (accessed March 4, 2011).
2. Cocciaelli, Susan, Ray Boshara, and Dorothy Suput. “Financing Farming in the U.S.” The W.K. Kellogg Foundation Food and Community Project. [www.mottgroup.msu.edu/uploads/files/59/Financing%20Farming%20in%20the%20US.pdf](http://www.mottgroup.msu.edu/uploads/files/59/Financing%20Farming%20in%20the%20US.pdf) (accessed March 3, 2011).
3. “Farm Income and Costs: Assets, Debt and Wealth.” United States Department of Agriculture Economic Research Service. [www.ers.usda.gov/briefing/farmincome/wealth.htm](http://www.ers.usda.gov/briefing/farmincome/wealth.htm) (accessed February 10, 2011).
4. “Green Bank.” USAID. <[http://pdf.usaid.gov/pdf\\_docs/PNADK830.pdf](http://pdf.usaid.gov/pdf_docs/PNADK830.pdf)>. (accessed February 26, 2011).
5. Krome, Margaret, Teresa Maurer, and Katie Wied. “Building Sustainable Farms, Ranches and Communities.” National Sustainable Agriculture Information Service. <[http://www.altra.org/guide/Building\\_Sustainable.pdf](http://www.altra.org/guide/Building_Sustainable.pdf)>. (accessed December 2010).
6. “Green Bank.” USAID.
7. “Farm Start LLP.” The American Farmland Trust. <<http://www.farmland.org/documents/YeankeeCreditFarmStartinfo.pdf>>. (accessed February 10, 2011).
8. The Carrot Project. Microloan Application Process. [http://thecarrotproject.org/farm\\_financing/ma\\_vt\\_loans](http://thecarrotproject.org/farm_financing/ma_vt_loans) (accessed February 3, 2011).
9. Ibid.
10. The Northeast Organic Farming Association: Massachusetts Chapter. [http://www.nofamass.org/news/pdfs/newsletter01\\_2011.pdf](http://www.nofamass.org/news/pdfs/newsletter01_2011.pdf) (accessed November 2011).

# PROJECT ELLIL: ROOFTOP WIND TURBINES

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*Project Ellil proposes a plan to place wind turbines on the roofs and sides of existing skyscrapers, adding a “funnel” to concentrate the air around the turbine and thereby increasing wind speeds.*

## THE NEED

Project Ellil targets the Small Wind Turbine (SWT) market, defined as wind turbines with a capacity of less than 100 kilowatts,<sup>1</sup> and specifically, the rooftop wind turbine sector. According to the American Wind Energy Association (AWEA), the U.S. market grew 15 percent in 2009 in the depths of the recession.<sup>2</sup> Small Wind Turbines compete in the same market as photovoltaic (PV) systems, or solar panels.<sup>3</sup> Prices of SWT systems range from \$30,000 to \$80,000, compared to \$100,000 for PV systems.<sup>4</sup> The rooftop wind market comprised 2 percent of the total SWT market, with 17 companies offering systems globally.<sup>5</sup>

## HOW THE ELLIL CONCEPT WORKS

The Project Ellil concept uses wind turbines placed on the roofs of existing skyscrapers. To increase wind speeds without increasing maximum blade area, a funnel is used to speed up the wind using the Venturi Effect. The funnel works like a wind tunnel, increasing wind speed as the funnel area decreases. Rather than redesigning a wind turbine to take advantage of low wind speeds, our concept speeds up the wind to make it usable for turbines.

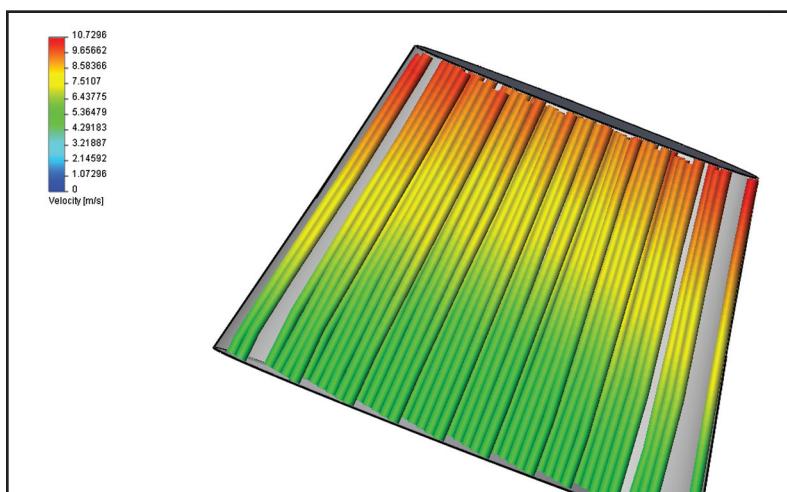


Figure 1 - Wind speed inside tunnel

Figure 1 represents a simulation of the expected wind speeds throughout the funnel, assuming an initial wind speed of 5 m/s. The average speed at the throat (the smaller exit) is 9.5 m/s. Carbon steel is used for the funnel's construction. In the Hudson River area of New York City, our design is expected to output the maximum power of the turbine 50% of the year, while overloading and

disengaging the blades less than 3% of the time.<sup>6</sup> The turbine itself would not require any changes, making this add-on modification a simple source of higher output for current turbines.

### MUNICIPALITY BENEFITS

Building a constellation of wind turbines would reduce overall consumption from the energy grid. Since both manufacturing and installation are possible in urban areas, Project Ellil can help create local, green jobs. Local power generation creates additional benefits as well: it eliminates transmission losses, reduces undesirable visual impacts of the high voltage grid on pristine environments, and reduces security concerns connected to protecting local energy grids.

### POTENTIAL STAKEHOLDERS

The Ellil wind turbine focuses on markets with scarce land and dense urban development, or “vertical cities.” In New York City, buildings contribute 32% of CO<sub>2</sub> emissions.<sup>13</sup> Since 7% of the city’s electricity comes from coal,<sup>14</sup> Mayor Bloomberg’s plan for wind energy to supply 10% of the city’s electricity would greatly reduce emissions.<sup>15</sup> Such technology could be interesting to urban policy makers, power companies, and building owners keen on going green and meeting the U.S.’s Kyoto goals.

Buildings with turbines embedded in their architecture already exist. The Strata, a 43 story building in London currently plans to implement a three-turbine system that is estimated to generate 50MWh per year.<sup>9</sup> Estimates suggest that the tower is expected to require approximately 625 MWh on average.<sup>10</sup> The Ellil system would provide 23.6% of the building’s annual power demands. Strata’s wind turbines were embedded in the architecture, Ellil would retrofit existing skyscrapers to support rooftop wind turbines.



Figure 2 - Model of Ellil on skyscraper

### HOW ELLIL COMPARES TO CONVENTIONAL SOURCES:

- Using Aeolos 20W wind turbines, an Ellil system produces 72 MWh per year per turbine (using LaGuardia wind data).<sup>7</sup>
- Ellil Turbine Electricity cost: \$0.0589/KWh.
- Average rates: \$0.0962/KWh<sup>8</sup>

## **COMPETITIVE WITH THE GRID**

The projected total cost of a system (1 turbine + 1 funnel) is \$85,000. A wind turbine costs \$52,015, with maintenance estimated to be \$13,980, based on historical data.<sup>11</sup> The funnel's projected cost is \$17,000 per unit, after incorporating costs for research and development. For the Ellil system, rate per output is approximately \$0.0589/KWh. According to the Energy Information Administration, the average rate per output for a conventional small wind turbine system is \$0.0962/KWh,<sup>12</sup> making Ellil systems economically competitive with conventional sources of energy.

## **SUCCESSES AND PROBLEMS TO OVERCOME**

As of now, Solid Works simulations have shown that our idea is feasible (see figure 1, above). The Ellil team is prepared to begin wind tunnel tests. Barriers include the lack of adequate wind data, and the fact that the design would have to be economically modified to connect to each skyscraper's unique frame.

## **NEXT STEPS**

The project currently seeks to raise approximately \$50,000 (\$425/hr cost of using wind turbine<sup>13</sup>) and local incubator support to begin physical testing of the device. A series of experiments have been formulated to test wind speed changes, structural analysis, sound/vibrations, and other factors. Manhattan municipal buildings would provide ideal properties for prototyping, and the project seeks government support for implementation at such locations.

## **ENDNOTES**

1. "AWEA Small Wind Turbine Global Market Study." American Wind Energy Association. Accessed April 20, 2011. Available at: [http://www.awea.org/learnabout/smallwind/upload/2010\\_AWEA\\_Small\\_Wind\\_Turbine\\_Global\\_Market\\_Study.pdf](http://www.awea.org/learnabout/smallwind/upload/2010_AWEA_Small_Wind_Turbine_Global_Market_Study.pdf)
2. Ibid.
3. Ibid.
4. Curwin, Trevor. "Big Market But Big Challenge For Small-Wind Turbine Makers". CNBC News. April 18, 2010. Accessed April 20, 2011. Available at: [http://www.cnbc.com/id/36385243/Big\\_Market\\_But\\_Big\\_Challenge\\_For\\_Small\\_Wind\\_Turbine\\_Makers](http://www.cnbc.com/id/36385243/Big_Market_But_Big_Challenge_For_Small_Wind_Turbine_Makers)
5. "AWEA Small Wind Turbine Global Market Study." American Wind Energy Association.
6. NOAA Wind data. Accessed February 23, 2011. Available at: <ftp://ftp.ncdc.noaa.gov/pub/data/asos-onemin/>
7. "20 KW Wind Turbine" Aeolos Wind Turbine Company. Accessed February 23, 2011. Available at: <http://www.windturbinestar.com/20kwh-wind-turbine.html>
8. Electric Power Monthly. US Energy Information Administration. April 2011. <http://www.eia.doe.gov/cneaf/electricity/epm/epm.pdf>
9. Schwartz, Ariel. "Strata Tower: The First Building With Wind Turbines Incorporated Into Its Design." *Fast Company*. March 15, 2010. Available at: <http://www.fastcompany.com/1583813/strata-tower-the-first-building-with-wind-turbines-incorporated-into-its-design>
10. Ibid.
11. Hau, Erich. *Wind Turbines: Fundamentals, Technologies, Application, Economics*. Trans. Horst von Renouard. 2nd Ed. New York: Springer, 2006.
12. Electric Power Monthly. US Energy Information Administration. April 2011.
13. "Inventory of New York City Greenhouse Gas Emissions." PlaNYC2030.
14. Ibid.
15. LaMonica, Martin. "Mayor Bloomberg Floats New York City Wind Plan". *CNET News*. Aug 20, 2008. Accessed April 20, 2011. Available at: [http://news.cnet.com/8301-11128\\_3-10020875-54.html](http://news.cnet.com/8301-11128_3-10020875-54.html)
16. Goodrich, Melinda and Jenele Gorham. "Wind Turbines Of The Western Hemisphere." Library of Congress. June 2008. Accessed March 28, 2011. Available at: [www.loc.gov/rr/frd/pdf.../Western\\_Hemisphere\\_Wind\\_Tunnels.pdf](http://www.loc.gov/rr/frd/pdf.../Western_Hemisphere_Wind_Tunnels.pdf)











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