



coolcities

Solving global warming one city at a time



## **COOL CASH: HOW LOCAL GOVERNMENTS ARE USING SMART ENERGY SOLUTIONS TO SAVE TAXPAYER DOLLARS AND CURB GLOBAL WARMING**

Communities all over America are responding to the threat of global warming with smart energy solutions. Over 300 mayors, representing 50 million Americans in 46 states have signed the U.S. Mayors Climate Protection Agreement, pledging to reduce global warming pollution in their cities to 7 percent below 1990 levels by 2012 (see [www.seattle.gov/mayor/climate](http://www.seattle.gov/mayor/climate)).

These “Cool Cities” are working to meet this goal with practical and innovative energy solutions that reduce energy waste and pollution. As the examples in this fact sheet indicate, cities of every size and region in the country have discovered that smart energy solutions like cleaner cars, energy efficiency and renewable energy are paying big dividends by reducing energy costs.

Through energy efficiency and clean renewable energy technologies, cities are saving millions of taxpayer dollars every year and curbing global warming emissions. These savings enable communities to turn around and invest more on schools, job creation, essential services and new infrastructure.

### **COOL CITIES ACROSS AMERICA ARE SAVING MONEY AND PROTECTING THE ENVIRONMENT**

The Sierra Club's survey of city energy solutions only counted the energy cost savings reported by the cities themselves, research reports and news accounts. The 43 cities profiled in this report are currently saving nearly \$140 million and reducing more than 500,000 tons of global warming pollution every year through energy efficiency, clean renewable power and cleaner automobiles.

In addition, a report by the International Council for Local Environmental Initiatives (ICLEI), found that the clean energy solutions adopted by the 159 U.S. cities in their Cities for Climate Protection ([www.iclei.org/co2/](http://www.iclei.org/co2/)) program have collectively realized annual cost savings of over \$535 million in energy and fuel costs, while reducing global warming pollution by 23 million tons every year.

The exciting news is that the energy savings documented below in this report represent just a small fraction of the “cool cash” that U.S. cities are earning through smart energy solutions. These successes highlight the great potential for all our cities to save money while leading the way toward a safer and more secure energy future.

## ◆ ENERGY EFFICIENCY SOLUTIONS

Energy efficiency—using less energy through better technology—is the most cost-effective and fastest way to meet our energy needs. Numerous cities are realizing impressive returns from their investment in high-tech interior and street lighting, energy-efficient building standards and retrofits, and modernizing heating, cooling and other systems.

By replacing outmoded light bulbs in street traffic lights with highly-efficient LED (light emitting diode) bulbs, U.S. cities report over \$10.4 million savings every year. This simple solution is working for big cities like Denver (\$218,000/year savings), Kansas City (\$95,000/year), and Salt Lake City (\$50,000/year) as well as for smaller cities such as Keane, NH (\$3,854/year). Passaic, NJ reduced their annual energy bill by \$65,000 by changing the light bulbs at just 40 intersections.

Installing efficient compact florescent light bulbs in interior lighting in 60 municipally-owned buildings is saving Palo Alto, CA \$117,625 each year. The small town of Saco, ME has projected a \$15,000 annual energy savings from a proposed lighting upgrade in all of their school and municipal buildings.

Modernizing both old and new building with energy-efficient building designs and materials are delivering impressive energy cost savings. Dallas is saving \$246,000/year at one police headquarters by meeting the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) standards (usgbc.org). Silver Fossil Ridge High School in Ft. Collins, CO reduced its energy costs by \$70,000/year in this way.

Large facilities such as Pittsburgh's new David Lawrence Convention Center (\$500,000 dollars saved annually) are significantly lowering their energy costs through energy efficient designs. Austin, TX is saving \$480,000 per year by retrofitting 40 schools with energy efficient measures. The Twin Falls, ID school district upgraded its 11 schools with more efficient lighting and improvements to the heating, ventilation, and air-conditioning systems, which is expected to reduce energy costs by \$3.5 million.<sup>1</sup>

When cities put together a comprehensive energy efficient plan, the savings are even more striking. Austin's city-owned utility's residential and commercial energy efficiency program is saving \$28.9 million per year while reducing global warming pollution by 59,000 tons annually. Similar programs in Ft. Collins (\$4.4 million/year), Portland, OR (\$2.3 million/year), and St. Paul, MN (\$7.9 million/year) reap impressive savings as well.

## ENERGY EFFICIENCY SOLUTIONS

City	Policy Adopted	Cost Savings (\$/Yr)	Greenhouse Gas Reduction (Tons eCO2/Yr)	Payback Time (Years)
ARLINGTON, MA	Energy efficient street lights installed. <sup>2</sup>	\$96,000		0.5
ARLINGTON, MA	Town library lighting replacement. <sup>3</sup>	\$9,000		1
AUSTIN, TX	City utility savings through residential & commercial energy efficiency programs <sup>4</sup>	\$28,929,023	59,000	
AUSTIN, TX	Energy efficiency retrofits at 40 schools <sup>5</sup>	\$480,000		6.9
BROOKLINE, MA	LED traffic lights installed <sup>6</sup>	\$58,941	<sup>7</sup>	2.8
BROOKLINE, MA	Curbside Recycling <sup>8</sup>	\$179,265		3.2
CAMBRIDGE, MA	Energy efficiency projects in municipal and school buildings. <sup>9</sup>	\$470,850		5.25
CHARLESTON, SC	Energy-saving improvements <sup>10</sup>	\$625,000	3,805	
CHICAGO, IL	Green Bungalow Initiative - Energy Efficiency retrofits(4 homes) <sup>11</sup>	\$900/home	56	4.6-8.1
CHICAGO, IL	LEED Platinum Chicago Center for Green Technology <sup>12</sup>	\$29,000		

CHICAGO, IL	Retrofitting all 105 fire stations with energy efficient lighting in 2006 <sup>13</sup>	\$250,000	3,515	
CHULA VISTA, CA	LED traffic lights installed <sup>14</sup>	\$74,000		
CLACKAMAS, OR	LEED Silver Clackamas High School <sup>15</sup>	\$69,000		
DALLAS, TX	LEED Silver Jack Evans Police Headquarters <sup>16</sup>	\$246,000		
DENVER, CO	LED traffic lights installed <sup>17</sup>	\$817,000		
DENVER, CO	Webb Municipal Building certified by USEPA's Energy Star Program <sup>18</sup>	\$218,000		
FORT COLLINS, CO	LED traffic signals installed at more than 160 intersections <sup>19</sup>	\$110,000 expected	3,000	3.4
FORT COLLINS, CO	LEED Silver Fort Collins Utilities Vehicle Storage <sup>20</sup>	\$9,000		
FORT COLLINS, CO	LEED Silver Fossil Ridge High School <sup>21</sup>	\$70,000		
FORT COLLINS, CO	Energy consumption reduction targets of the Electric Energy Supply Policy <sup>22</sup>	Avg. \$4,444,444 <sup>23</sup>		
FREEPORT, ME	Repaired heating control systems in the Public Safety Building and the Public Library. <sup>24</sup>	\$320	1.85	
FREEPORT, ME	Energy-efficient lighting retrofit in Public Safety garage. <sup>25</sup>	\$1,620	9.3	4
KANSAS CITY, MO	2,518 LED traffic lights installed <sup>26</sup>	\$95,000		5.8 <sup>27</sup>
KANSAS CITY, MO	Energy Efficient Retrofits of City Buildings <sup>28</sup>	\$1,500,000		
KEENE, NH	Energy Efficient Equipment at Waste Water Treatment Plant <sup>29</sup>	\$27,914	182	
KEENE, NH	LED traffic lights installed <sup>30</sup>	\$3,854		1-2 <sup>31</sup>
KING COUNTY, WA	LEED Gold King Street Center <sup>32</sup>	Avg. \$50,000 <sup>33</sup>		
NAPA, CA	Lighting retrofits <sup>34</sup>	\$69,630 projected		
NAPA, CA	590 LED traffic lights installed <sup>35</sup>	\$20,797 projected		
NAPA, CA	Parking lot lighting retrofits <sup>36</sup>	\$18,802 projected		
NEWTON, MA	35 energy efficiency projects in municipal & school district buildings. <sup>37</sup>	\$50,000	341	2
NEW YORK, NY	LED traffic lights installed at 11,600 intersections <sup>38</sup>	\$6,000,000		4.7 <sup>39</sup>
PALO ALTO, CA	LED traffic lights installed at 89 intersections <sup>40</sup>	\$120,000		
PALO ALTO, CA	Retrofit of lighting systems in 60 city buildings <sup>41</sup>	\$117,625		6.6 <sup>42</sup>
PALO ALTO, CA	Computer energy savings <sup>43</sup>	\$17,500		
PASADENA, CA	Customer energy efficiency savings through City services and incentives <sup>44</sup>	\$2,173,000		
PASSAIC, NJ	LED traffic lights installed at 40 intersections <sup>45</sup>	\$65,000		
PITTSBURGH, PA	LEED Gold David L. Lawrence Convention Center <sup>46</sup>	\$500,000		
PORTLAND, OR	More than 13,300 LED traffic lights installed	\$500,000 <sup>47</sup>	2300	3 <sup>48</sup>
PORTLAND, OR	LEED Certified Oregon Convention Center <sup>49</sup>	\$110,000		
PORTLAND, OR	City Energy Challenge - energy efficiency <sup>50</sup>	\$2,300,000		
POWAY, CA	City Buildings Lighting Retrofit Program - 600 bulbs changed to fluorescent <sup>51</sup>	\$9,640		
REDONDO BEACH, CA	Energy conservation measures <sup>52</sup>	\$200,000 projected		
SACO, ME	Proposed Energy Efficient Lighting in all school & municipal buildings <sup>53</sup>	\$15,200 projected <sup>54</sup>		5
SACRAMENTO, CA	23 Energy retrofit projects such as energy-efficient lighting, HVAC equipment, and LED traffic signals <sup>55</sup>	\$440,000		
SALEM, MA	Municipal parking garage lighting retrofit. <sup>56</sup>	\$21,887		2
SALT LAKE CITY, UT	Changed all lighting in city & county buildings to compact fluorescent	\$33,000 <sup>57</sup>		
SALT LAKE CITY, UT	LED traffic lights installed	\$50,000 <sup>58</sup>	716 <sup>59</sup>	
SAN DIEGO, CA	Energy-efficiency retrofit of City Administration Building Complex <sup>60</sup>	\$500,000		
SAN DIEGO, CA	Upgraded 86% of traffic lights to LED <sup>61</sup>	\$1,300,000	7,437	
SAN DIEGO, CA	Energy efficiency upgrade of Operations Center Administration Building <sup>62</sup>	\$14,000	45	
SAN DIEGO, CA	The City's Energy Conservation and Management Program <sup>63</sup>	\$3,500,000		
SAN FRANCISCO, CA	LED traffic lights installed <sup>64</sup>	\$1,200,000 expected		
SEATTLE, WA	Energy Conservation Efforts by Seattle City Light <sup>65</sup>	\$63,000,000	420,000	
SOMERVILLE, MA	LED traffic lights installed. <sup>66</sup>	\$62,700 expected		2
ST. PAUL, MN	Comprehensive Energy Conservation Improvement Program <sup>67</sup>	\$7,934,000	81,497	
VISALIA, CA	Energy efficiency retrofits - LED traffic lights, HVAC systems, city lighting <sup>68</sup>	\$143,185		

## ◆ GREEN VEHICLE SOLUTIONS

Making our cars, trucks, and SUVs go farther on a gallon of gas is the biggest single step we can take to saving money at the gas pump, cutting America's dependence on oil, and curbing global warming. Many cities are cutting their global warming emissions by purchasing gas-electric hybrid cars and SUVs for their city vehicle fleet. By using less gasoline, hybrid vehicles release a fraction of the global warming and air pollution emitted by conventional vehicles while saving money at the gas pump.

By "greening" its automobile fleets with 113 hybrid vehicles, Chicago spends \$21,000 less per year in fuel and maintenance costs. Los Angeles' 572 hybrids, combined with over 900 alternative fuel vehicles, save a whopping \$9 million per year. Charlotte estimates that the fuel savings for its 21 hybrid cars (\$16,800-\$25,000/year) will offset the higher cost of hybrids in 2.5 to 5.5 years.

When it comes to greening city fleets, cleaner cars aren't the only way to earn "cool cash". For example, by placing police units on bicycles instead of driving cars, both Brookline, MA and Keene, NH are slashing costs and cutting pollution.

### GREEN VEHICLE SOLUTIONS

City	Policy Adopted	Cost Savings (\$/Yr)	Greenhouse Gas Reduction (Tons eCO2/Yr)	Payback Time (Years)
BROOKLINE, MA	Police Units on Bicycles <sup>69</sup>	\$7,229	4.8 <sup>70</sup>	0.1
BROOKLINE, MA	Hybrids- 2 Toyota Prius <sup>71</sup>	\$1,019	<sup>72</sup>	11.1
CHARLOTTE, NC	21 Honda, Toyota, and Ford Hybrids <sup>73</sup>	\$16,800-\$25,200		2.5-5.5
CHICAGO, IL	113 hybrid vehicles <sup>74</sup>	\$21,000		
DENVER, CO	55 hybrids (Prius) & use of biodiesel <sup>75 76</sup>	\$40,000	10 to 15	
KEENE, NH	Police Units on Bicycles <sup>77</sup>	\$805	6	
LOS ANGELES, CA	572 hybrid-electric cars, over 900 alternative fuel vehicles <sup>78</sup>	\$9,000,000		
MECKLENBURG CO., NC	6 Toyota and Ford Hybrids <sup>79</sup>	\$4,800-\$7,200		2.5-5.5
SALT LAKE CITY, UT	Green Fleet <sup>80</sup>	\$156,000 <sup>81</sup>	327 <sup>82</sup>	

## ◆ RENEWABLE ENERGY SOLUTIONS

Cities around the country are investing in clean and renewable power like solar and wind energy to lower global warming emissions and create a reliable source of safe, homegrown electricity. Renewable power, combined with energy efficient buildings and appliances, is an essential and cost-effective solution for replacing electricity from dirty, fossil fuel power plants.

In Iowa, two wind turbines at Spirit Lake Elementary School are saving \$120,000 and reducing global warming pollution by over 2100 tons every year. The first wind turbine installed by the city of Hull, MA has been so successful—\$128,000 cost savings/year—that the city has put up a second one.

Solar panels plus efficiency measures are expected to lower energy costs at San Francisco's Moscone Convention Center by \$210,000/year, preventing the release of over 1,100 tons of global warming pollution each year. The 10 kilowatt (kW) solar thermal array at one fire house in Chicago is saving the city \$1000 a year.

Other renewable energy solutions such as geothermal and landfill methane recovery systems are also reducing city energy costs. A geothermal heat and cooling system at a municipal building in Park Hills, MO reduces energy costs by \$4,800 annually and will pay for itself in less than 5 years. Great Bridge Middle School's geothermal system in Chesapeake, VA saves \$41,500/year with a 6-year payback time.

Captured methane gas from a landfill helps to power Antioch Community High School in Illinois, reducing the school's energy costs by \$100,000/year, while keeping 4,409 tons of global warming pollution out of our atmosphere. In some cases, cities are also profiting by selling methane recovered from landfills. Upper Marlboro in Prince George's County, MD makes an average of \$720,000/year this way.

## RENEWABLE ENERGY SOLUTIONS

City	Policy Adopted	Cost Savings (\$/Yr)	Greenhouse Gas Reduction (Tons eCO2/Yr)	Payback Time (Years)
ALAMEDA COUNTY, CA	Eight photovoltaic systems installed throughout the county totaling over 2.3 MW. <sup>83</sup>	\$700,000	683	
ANN-ARBOR, MI	Landfill Gas-to-Energy Project <sup>84</sup>	\$35,000 <sup>85</sup>	71,907	
ANTIOCH, IL	Landfill Methane Recovery for power at Antioch Community High School <sup>86</sup>	\$100,000	4,409	
ARLINGTON, VA	Geothermal Heating & Cooling System at Taylor Elementary School <sup>87</sup>	\$20,800		5
BROOKLINE, MA	Home Composting Program <sup>88</sup>	\$11,616	13.5 <sup>89</sup>	0.1
CHICAGO, IL	10 kW Solar Thermal Array at 1 Fire House <sup>90</sup>	\$1,000		
CHESAPEAKE, VA	Geothermal Heating & Cooling System at Great Bridge Middle School South <sup>91</sup>	\$41,500		6
HULL, MA	Wind turbine #1 <sup>92</sup>	\$128,850	1,200	
	Wind turbine #2	\$407,800 <sup>93</sup>	3,000 <sup>94</sup>	
KEENE, NH	Landfill gas-to-energy system <sup>95</sup>	\$55,000	140	5
LAKE ELSINORE, CA	Elsinore Valley Municipal Water District installed photovoltaic solar power systems on their maintenance and administrative buildings and carports. <sup>96</sup>	\$170,000	330	
NAPA, CA	Solar power system at Lake Hennessey Pump station. <sup>97</sup>	\$100,000 expected	140	
PARK HILLS, MO	Geothermal Heating & Cooling System at Municipal Building <sup>98</sup>	\$4,800		4.6 <sup>99</sup>
PATTONVILLE, MO	Landfill Methane Recovery for power at Pattonville High School <sup>100</sup>	\$40,000	2,000	
QUEEN CITY, MO	Geothermal Heating & Cooling System at Schuyler Elementary School <sup>101</sup>	\$30,000		3 <sup>102</sup>
SACO, ME	Proposed Windmill <sup>103</sup>	Up to \$800 <sup>104</sup>		10

SAN FRANCISCO, CA	Solar Panels and energy efficiency measures in Moscone Center	\$210,000 expected <sup>105</sup>	Avg. 1167 <sup>106</sup>	
SAN FRANCISCO, CA	Southeast Water Treatment Plant installed 255 kW solar roof system. <sup>107</sup>	\$38,400	100	
SONOMA COUNTY, CA	Sonoma County Water Agency installed 522 kW of roof and parking system solar arrays. <sup>108</sup>	\$117,000	207	
SPIRIT LAKE, IA	2 Wind turbines at Spirit Lake Elementary School <sup>109</sup>	\$120,000	2,102	
TUCSON, AZ	Methane capture for energy at Los Reales Landfill <sup>110</sup>	\$500,000 <sup>111</sup>	21,103	
UPPER MARLBORO, MD	Energy from Landfill Methane Recovery Sold by Prince George's County <sup>112</sup>	Avg. \$720,000 <sup>113</sup>	5,842	

## **SAVING TAXPAYER DOLLARS AND CURBING GLOBAL WARMING BY RE-ENERGIZING YOUR CITY**

Mayors and other local public officials have a responsibility to reduce costs and spend taxpayer dollars wisely. They also are charged with taking steps to protect our environment. The success stories in this fact sheet demonstrate that local officials are meeting these obligations and building cleaner and more affordable communities by investing in smart energy solutions.

If every community in the United States took action with energy efficiency, renewable power and clean vehicle solutions, billions of dollars that are now literally being wasted could go to improving city services, bettering our schools, and re-building our aging infrastructure.

By reducing the rising costs of energy, Cool Cities are reducing the cost of government while solving global warming, one city at a time.

Now it's your city's turn.

**For more information, including the Sierra Club's Guide to Local Global Warming Solutions, and to get involved in a Cool Cities campaign in your city, go to: [www.coolcities.us](http://www.coolcities.us).**

### **Acknowledgements**

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<sup>69</sup> Town of Brookline, Massachusetts. *Local Action Plan on Climate Change*. 2002. 17. 9 Aug. 2006 <http://www.townofbrooklinemass.com/Conservation/PDFs/ClimateActionPlanTOB.pdf#page=5>.

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<sup>71</sup> Town of Brookline, Massachusetts. *Local Action Plan on Climate Change*. 2002. 18. 9 Aug. 2006 <http://www.townofbrooklinemass.com/Conservation/PDFs/ClimateActionPlanTOB.pdf#page=5>.

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<sup>73</sup> City of Charlotte. *The Green Sheet: The Case for Hybrids* and David Friday, Charlotte Fleet Environmental Analyst.

<sup>74</sup> City of Chicago. *Environmental Action Agenda: Building the Sustainable City*. 2006. 3. 9 Aug. 2006 [http://egov.cityofchicago.org/webportal/COCWebPortal/COC\\_ATTACH/ActionAgenda.pdf](http://egov.cityofchicago.org/webportal/COCWebPortal/COC_ATTACH/ActionAgenda.pdf).

<sup>75</sup> "A Green Fleet For Denver." *Fleet Maintenance Division*, City and County of Denver. 10 Aug. 2006 [http://www.denvergov.org/Fleet\\_Maintenance\\_Division/368news.asp#1805](http://www.denvergov.org/Fleet_Maintenance_Division/368news.asp#1805).

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<sup>79</sup> City of Charlotte. *The Green Sheet: The Case for Hybrids* and David Friday, Charlotte Fleet Environmental Analyst.

<sup>80</sup> Minimization of the fleet. Got rid of many SUVs and bought hybrids and compacts.

<sup>81</sup> Bennett, Vicki. Salt Lake City Environmental Programs Manager. Personal interview. 28 June 2006. Fleet use of diesel dropped 30,000 gallons last year. The airport fleet's use of gas dropped 10,000 gallons last year and dropped by 12,000 gallons of diesel. Figured at \$3.00/gal.

<sup>82</sup> "Salt Lake City Climate Action Plan." *Salt Lake City and the Environment*, Salt Lake City Green. 10 Aug. 2006 <http://www.slccgreen.com/pages/actionplan.htm>.

<sup>83</sup> "Case Study: County of Alameda, California." *PowerLight*. 15 Nov. 2006 [http://www.powerlight.com/success/pdf/PowerLight\\_Case-Study\\_AlamedaCounty.pdf](http://www.powerlight.com/success/pdf/PowerLight_Case-Study_AlamedaCounty.pdf)

<sup>84</sup> "Landfill Gas-To-Energy Project." *City of Ann Arbor Michigan*. 27 July 2006. 10 Aug. 2006 <http://www.ci.ann-arbor.mi.us/PublicServices/SystemsPlanning/Energy/LandfillEnergy.html>.

<sup>85</sup> \$20,000/year is saved by the city and DTE Biomass pays the city \$15,000/year

<sup>86</sup> "Antioch Community High School." *Lanfill Methane Outreach Program*, U.S. Environmental Protection Agency. 8 March 2006. 10 Aug. 2006 <http://www.epa.gov/lmop/proj/prof/profile/antiochcommunityhighschool.htm>

<sup>87</sup> "Taylor Elementary School: Arlington, Virginia." *Geoexchange*. 10 Aug. 2006 <http://www.geoexchange.org/pdf/cs-076.pdf>.

<sup>88</sup> Town of Brookline, Massachusetts. *Local Action Plan on Climate Change*. 2002. 46. Aug. 2006 <http://www.townofbrooklinemass.com/Conservation/PDFs/ClimateActionPlanTOB.pdf#page=5>.

<sup>89</sup> This measure will reduce 189 tons of CO2 in 2010. The program was started in 1997. This is a reduction of 13.5 tons/year.

<sup>90</sup> "Chicago's Solar Benefits." *The Chicago Solar Partnership*. 10 Aug. 2006 <http://www.chicagosolarpartnership.com/index.php?submenu=About&src=gendocs&link=Benefits&category=About%20Us>

<sup>91</sup> The Apollo Alliance, ICLEI Local Governments for Sustainability. "High Performance Cities: A Guide to Energy Saving Policies for Urban Areas". 4. 10 Aug. 2006 <http://www.apolloalliance.org/docUploads/apollo-final.pdf>.

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<sup>93</sup> "Hull Wind II financial projections." *Sustainable South Shore*. 28 Sept. 2006 <http://www.sustainable.org/gallery.php>

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<sup>96</sup> "Success Stories: Elsinore Valley Municipal Water District." *PowerLight*. 15 Nov. 2006 <http://www.powerlight.com/success/elsinore.php>

<sup>97</sup> "City of Napa Dedicates Solar Power System at Lake Hennessey Pump Station". *PowerLight*, Renewable Energy Access. 18 Oct. 2006 <http://www.renewableenergyaccess.com/rea/market/business/viewstory?id=46105>.

<sup>98</sup> "Municipal Building: Park Hills, Missouri." *Geoexchange*. 10 Aug. 2006 <http://www.geoexchange.org/pdf/cs-064.pdf>

<sup>99</sup> With contribution from Union Electric and EPRI payback was actually immediate.

<sup>100</sup> "Pattonville High School Landfill Gas Recovery Project." *State and Local Net Greenhouse Gas Emissions Reduction Programs*, Pew Center on Global Climate Change. 10 Aug. 2006 <http://www.pewclimate.org/states.cfm?ID=12>

<sup>101</sup> "Schuyler Elementary School: Queen City, Missouri." *Geoexchange*. 10 Aug. 2006 <http://www.geoexchange.org/pdf/cs-029.pdf>

<sup>102</sup> This is the payback time on the additional cost of \$90,000 for the Geoexchange system.

<sup>103</sup> Harkness, Seth. "Something New in the Wind for Saco". *Portland Press Herald* 29 July 2006. 10 Aug. 2006 <http://pressherald.mainetoday.com/news/york/060729windmill.shtml>.

<sup>104</sup> The project will cost up to \$8,000 and pay for itself in 10 years. This works out to an average savings of \$800/year.

<sup>105</sup> Blum, Andrew. "Solar Power Goes Urban at SF's Moscone Center." *The Sustainable Metropolis*, Metropolis Magazine. 10 Aug. 2006 <http://www.metropolismag.com/html/sustainable/case/MosconeCenterSolar.html>

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- <sup>109</sup> “Case Study: Spirit Lake, Iowa”. Green Power. ICLEI. 10 Aug. 2006 <http://www.greenpowergovs.org/wind/Spirit%20Lake%20case%20study.html>
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- <sup>112</sup> “Brown Station Road On-Site Electrical Generation Project.” Landfill Methane Outreach Program. US EPA. 8 March 2006. 10 Aug. 2006 <http://www.epa.gov/lmop/proj/prof/profile/brownstationroadonsiteele.htm>
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