

Green Economic Development Strategies for the Chicago Region

Prepared
by The Delta Redevelopment Institute

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A note about this report:

The Delta Redevelopment Institute prepared this report with recommendations on this topic for consideration in the *GO TO 2040* plan. The intent is to assist CMAP as it incorporates policies, investments, and other actions to move us towards our regional vision. This report is meant to gather background information, clarify issues, conduct numerical analysis, and present potential recommendations for CMAP's consideration. CMAP Staff has not verified the contents of this report. This report contains the opinions of the authors, and does not represent CMAP policy.

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Introduction and Acknowledgements

Environmental, national security and most recently job creation goals have converged to generate strong public interest, political support and an array of new policies and incentives to support green energy, energy efficiency, and waste reduction. A paradigm shift of relevant economic development drivers is occurring as a result of growing concerns—and associated policy developments and incentive programs—related to resource scarcity issues associated with climate change, air quality, raw materials, water supply, and land use. This report examines the potential of these new policies and incentives to create jobs and private-sector investment in the Chicago region.

Most of the information in this report was gathered from existing reports that are listed as references. Reports from the U.S. Conference of Mayors and the Renewable Energy Policy Project (REPP) in Washington D.C. were especially helpful in identifying specific industries that are emerging and that have potential. REPP was also able to provide data on businesses within Illinois with detailed industry codes that would indicate potential for manufacturing energy equipment.

We are also grateful to local experts who provided information for this report. Dylan Tuttle, a wind supply chain expert at the Jane Addams Resource Center and Kevin Borgia, executive director of Wind For Illinois, provided valuable information on the emerging Illinois wind industry. Pete Kadens, president of SoCore Energy LLC and George Kramerich, president of Solar Tracking Skylights helped with information on the solar energy and green building industries. Ed Kalebich, manager at Robbins Community Power, Nate Harrison at Tetra Vitae LLC and Guenther Recknackel provided help understanding developments in biomass energy and biobased chemicals industries. Sylvia Coronado, Cal King, and Anna Nussbaum of Recycling Systems, Inc. provided insights into the challenges and opportunities for the recycling industry. Terry Shelley of Intercon Solutions gave insights into the e-waste recycling industry. Rachel Weber and Susan Kaplan at UIC's College of Urban Planning and Institute for Environmental Policy developed research on the waste and deconstruction industry for the region. David Chandler, Senior Business Analyst at the Center for Neighborhood Technology shed light on the importance of the freight industry in the region and what it is doing to go green. Dennis Vicchiarelli and Gretchen Kosarko at World Business Chicago provided data on other key existing industries in the region.

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Executive Summary

“With smart federal and local policies, climate solutions can be a progressive force economically. Building a clean energy economy can generate literally hundreds of billions of dollars of productive new investments on a scale equal to that of the greatest periods of past American economic expansion.”

– Van Jones, *The Green Collar Economy* (2008).

Attitudes toward supporting and investing in green energy, alternative fuel, greener buildings and businesses have changed dramatically over the past decade in the wake of threats to our national security and global environment. Catastrophic events such as 9/11 and Hurricane Katrina have awakened public awareness of the deadly side-effects of dependence on fossil fuels, both by shifting wealth to countries that view Americans as enemies and by triggering more frequent severe weather events.



More recently green is also seen as a path to reviving the American economy. A virtual library of green jobs reports has been released since the fall of 2008 with the onset of financial crisis in financial, construction and automobile manufacturing sectors. Each assumes that new federal regulation and investment will drive sustained demand for renewable fuels and pressure to conserve resources over the next several decades.



Recent reports on green economy, green jobs, and climate change strategies.¹

Although the green movement in the nation and the region is still emerging, the Chicago region is already well positioned in the movement with some unique competitive advantages. Chicago has placed well in some national rankings of cities, including a 6th place ranking in a 2008 green jobs report by the United States Conference of Mayors. The Chicago region also has existing assets that it can capitalize upon to create new jobs in emerging green sectors including: electricity generation from renewable sources (especially from wind), manufacturing of energy equipment, construction and maintenance of energy and fuel equipment, retrofitting existing buildings and providing business and professional services to green businesses.

¹ From left to right (see References): McKinsey & Company; Chicago Climate Action Plan; Good Jobs First; Pinderhughes; U.S. Conference of Mayors; Gereffi; Makower; Pollin.

Climate change commitments by major corporations, colleges and universities, the City of Chicago and other smaller cities in the region in just the past two years provide the potential to create new green business opportunities and jobs in the region. The Chicago Climate Change Action Plan, released in 2008, is by far the most ambitious public-sector effort to date in the region. The plan establishes goals for increasing renewable energy use, conserving fossil-fuel based electricity and reducing waste.

Mayors and managers from nearly 100 municipalities in the region have also made at least some commitments by signing onto the Metropolitan Mayors Caucus' Greenest Region Compact, a voluntary initiative to improve the region's air, water and land, reduce greenhouse gases, minimize waste, and reduce energy consumption through a series of environmental actions.

Although less ambitious than the Chicago Climate Action Plan, it is the first real effort to coordinate efforts on a regional basis. A December 2008 survey by CMAP of Green Practices by Local Government documents efforts that over 175 constituents in the 7-county CMAP region are individually taking or considering taking to promote energy and water conservation and to reduce waste. Although early plans and commitments by green leaders can provide some ideas and targets for other smaller cities to consider, the City of Chicago and other early adopters are just getting started in developing specific strategies and implementation plans for accomplishing their targets.

State regulation of major utility companies and rate settlements in 2007 has also generated new financial resources for green energy and energy efficiency programs, which at present include purchase of wind energy and renewable energy credits (RECs), energy efficiency project incentives for building owners, prescriptive incentives for energy efficiency equipment upgrades and improvements, and an energy self-assessment tool for small businesses.

These programs are partially the result of settlements relating to rate increases and new state mandates adopted in 2007. The goals in the state standards are scheduled to ramp up over the next dozen years.

The recent federal stimulus package is an important springboard for the creation of new jobs in emerging green industries but may not be enough to sustain growth over a 30-year period without a stronger regional commitment to green existing key industries and overcome existing challenges.

Major existing challenges include the need for:

1. A regional sustainability plan that provides a definition and baseline for measuring the green economy and goals for achieving real progress in reducing greenhouse gases region wide
2. Local venture capital, loan guarantees and other financing for green tech businesses
3. Organizational infrastructure to support green business and green industries
4. An improved business climate for green business
5. Education on policies and incentives driving growth in green business activity

6. Solutions for challenges facing specific emerging green industries, such as the lack of ideal climate conditions for wind or solar energy power generation; financing constraints especially for new highly capital intensive businesses; and the perception of abundant supply despite the reality of landfills filling up quickly and water supplies are finite.

Despite these challenges circumstances have converged to provide opportunities to develop a wide range of new green industries that range from manufacturing wind turbine components or water-saving plumbing fixtures to new services to certifying or verifying greenness of products.

Opportunities for the greatest economic growth in the next decade are in emerging green industries that are building on existing capacity in the region, such as manufacturing of components for wind turbines or solar panels by metal manufacturers who are already producing similar products. Comparing the NAICS (North American Industry Classification System) codes of wind turbine and solar panel parts to the NAICS codes of companies in the 7-county area revealed that 1194 companies had NAICS codes matching one or more wind turbine parts, and 680 companies had NAICS codes matching one or more solar panel parts. Mining the pool of these thousands of potential equipment suppliers in the region is a major opportunity for the region. A few groups in the region are already beginning to survey potential suppliers in this field.

Greening of key existing industries in the region such as freight transportation also needs to be part of a regional plan for retaining and strengthening existing business. As North America's freight hub, Chicago is positioned to be a major economic player in the growth of the freight industry. The volume of freight moving through the Chicago region is projected to increase by 70% to 80% between the years 2000 and 2030, making freight movement and distribution one of Illinois' fastest growing industries. (Chicago Metropolitan 2020) In order for this growth to minimize environmental impacts and optimize economic benefits within the Chicago area, two linked policies are required: routing of cargoes to terminals and locations that minimize intra-regional truck trips and a policy of land use planning and economic development that maintains viable industrial centers near freight facilities in the city and inner-ring suburbs of Chicago. (Chandler, 2009)

This report includes goals, objectives and strategies that can serve as a framework for a regional green economic development plan. However, until there is consensus on how to define the region's green economy, it is not possible to measure where the region is now or track progress. The following table outlines the major goals and objectives recommended in this report. Specific strategies for achieving each objective as well as suggestions on organizations who might lead various recommendations are described in the report.

Goal	Objectives To Achieve Goal
1. Develop and implement a regional sustainability plan	<ul style="list-style-type: none"> • Form a regional coordinating body to develop the plan. • Establish a baseline for tracking growth in the region's green economy. • Support renewable energy production in the region. • Enact policies and practices that create demand for renewable energy production in the region. • Enact policies and practices that create demand for green building products and services. • Enact policies and practices that create demand for waste reduction and resource conservation. • Assign responsibility for tracking progress in achieving and updating goals by industry and sub-region where possible.
2. Increase capital funding for green business	<ul style="list-style-type: none"> • Support the creation of a new Midwest clean tech venture capital fund. • Support public loan guarantee programs. • Develop other nontraditional financing programs.
3. Create networks and support centers	<ul style="list-style-type: none"> • Identify gaps & overlaps in networks and support centers and how to fill/resolve/fund them. • Develop new central energy office to support a network of targeted offices in the region to address common short-term and longer-term needs for specific renewable energy sectors as well as needs that cut across sectors.
4. Create new or improve existing incentives, policies, regulations, and standards	<ul style="list-style-type: none"> • Develop up-to-date knowledge of incentives for green or greening industries. Include federal, state, local and private/market-based incentives and analysis of their availability, how they compare to incentives offered by competing states and regions, and what else is needed. • Develop new information on how local government can support sustainability through public policies, financial investment and purchasing decisions. • Identify policy/regulatory barriers and recommend changes that foster green economic development. • Improve industry standards and certifications for trained workers and safe work practices for emerging green industries that currently lack clear standards. (Example: lack of clear standards for deconstruction workers.)
5. Provide education, information, and training	<ul style="list-style-type: none"> • Educate the business and economic development communities about the economic implications and opportunities of a resource constrained economy, with emphasis on carbon and water resources. • Expand education to business and economic development communities about economic incentives for emerging green business and greening of existing businesses.

Existing Conditions

A. Climate Change and Resource Scarcity

Climate change and water conservation are the two most prominent resource scarcity issues (opportunities) facing this region in the coming decade, and both have the potential to shift business practices and growth in the nation and the region. However, they are not issues that many business and government leaders in the Chicago region are prioritizing and actively committed to at the present time. Air pollution regulations currently affect a small segment of businesses in the region. Water use is currently not regulated (or even metered) in most communities in the region with the exception of broad interstate compacts regarding the use of Lake Michigan water and seasonal bans on watering lawns in some locations. Although a CMAP survey of Green Practices for Local Governments in 2008 revealed that hundreds of municipalities in the region are doing something, very few are committing to take strong action to combat climate change. Only a small percentage of municipalities, businesses and institutions have climate change or sustainability plans.

Nonetheless, because Chicago is part of a global marketplace, and national, interstate, or global regulation of greenhouse gases and water are anticipated, this is expected to change rapidly over the next decade. As federal climate change regulations and regional water supply plans are developed, the role of climate change and resource scarcity is becoming increasingly important in the planning and business development decision making process. Both the public and private sectors are beginning to realize that fundamental shifts in their perspectives need to occur in order to adapt to the changing economic climate and to take advantage of new economic development opportunities that will arise from a carbon-constrained economy.

Plans ranging from international agreements like the Kyoto Protocol to the Chicago Climate Action Plan are highlighting the need to begin quickly addressing climate change at all levels of the economy. In fact, the Federal government is starting to debate policy that will impact state and local governments as well as many business and industrial sectors. It is possible that by the end of 2009 the Federal government will enact a bold new carbon-based cap and trade system that will place limits on carbon emissions as well as create a new commodity market in greenhouse gases. Such policy decisions will impact the region for the next several decades and beyond and, therefore, will need to be seriously considered in any discussion about economic development strategies and opportunities.

Of similar concern, policy and allocation systems for other scarce resources such as water may also emerge within the next 30 years. The Chicago region has a complex legacy with water management issues. The importance of water as a driver for growth and economic development goes without saying. However, through Supreme Court decisions, state water-use compacts, and other local agreements, the water available to the region from Lake Michigan and groundwater sources is fixed. Water use and conservation planning is beginning to take place regionally and the results of the research and investigations will likely impact new protocols on the use of water in the region. Other resources will

likely be impacted by future growth and economic development activities such as land use and availability, and transportation.

B. Current Status of Green Economy Sectors

Green Energy. Green energy sectors have competitive advantages in the Chicago region, especially for headquarters and white collar jobs. Growth is being driven by federal economic incentives and relatively new state renewable energy mandates. Investment in clean tech is already occurring in renewable energy sectors in the region. Growth in new wind farms in or near the region has been dramatic in the last two years following the adoption of a state Renewable Portfolio Standard that is one of the most aggressive in the country and the extension of the federal production tax credit for wind power producers. The maps below show the existing and proposed wind power plants in Illinois, courtesy Wind for Illinois. The “Proposed Sites” map includes only those that have been publicly announced; many other proposals are in the early stages of design and permitting and have not been publicly announced. According to Wind For Illinois, Illinois is very well positioned for a massive expansion of wind power production over the next 20 years due to three key factors: The large electric load of the Chicago region that would benefit from the relative proximity of adequate downstate Illinois wind power potential (compared to areas with excellent potential that are many hundreds of miles away), the existing capacity of the state’s power transmission infrastructure, and the robustness of the state Renewable Portfolio Standard.

Illinois Existing and Proposed Wind Power Maps

Existing Sites:



Proposed Sites (Publicly Announced Only):



Source: Wind for Illinois. “Illinois Wind Power Maps.” www.windforillinois.org (accessed 14 May 2009).

Opportunities for the greatest economic growth in the next decade are in emerging green industries that are building on existing capacity in the region, such as manufacturing of components for wind

turbines or solar panels by metal manufacturers who are already producing similar products. Comparing the NAICS (North American Industry Classification System) codes of wind turbine and solar panel parts to the NAICS codes of companies in the 7-county area revealed that 1194 companies had NAICS codes matching one or more wind turbine parts, and 680 companies had NAICS codes matching one or more solar panel parts. (See Appendix A for a breakdown of the number of companies by component and by county.) Mining the pool of these thousands of potential equipment suppliers in the region is a major opportunity for the region. A few groups in the region are already beginning to survey potential suppliers in this field.

Although far fewer utility-scale solar or biomass energy plants exist in the region, new federal stimulus incentives are supporting new development of a few projects. Significant breakthroughs in solar, biofuel and biomass industries are also possible in less than ten years and have the potential to generate new investment and employment in those sectors.

Green Buildings. It is difficult to measure economic growth in this sector since there are no industry codes for green developers, contractors or architects, but a recent dramatic increase in LEED building certification applications is evidence that the green building trend in the region is on the rise and is likely to continue. Growth in this sector is being driven by market trends, concern about high energy prices, climate change commitments and incentives. Competitive advantages for the region include a strong professional services (architecture and engineering) and construction trades along with an extensive job training network of community colleges and other organizations.

Waste Reduction. Growth in this sector is being driven by limited landfill capacity and relatively high waste disposal cost, recycling mandates by some cities and market demand for some recovered materials. Competitive advantages for the region include its large population and related waste streams and large low-skill labor pool. Recycled product manufacturing has advantages related to plentiful feedstock but faces many of the same challenges as renewable energy equipment manufacturing.

Greening Other Existing Sectors. Other key existing industries that have some strength in the region and the ability to “go green” include: freight transportation and certain specialized manufacturing industries (metal, food and chemicals). Although not “export” industries, government and institutions (universities and hospitals) comprise a significant portion of existing employment in the region. Existing businesses in a wide range of retail, banking and service industries are going green. Market differentiation, revenue generation, cost savings and concern about climate change are driving the green revolution. The challenge is in knowing what is truly green and what is “greenwashing” where a product is marketed as green when in fact it is not. The need for standards, verification and certification of green products and services is in itself creating a new industry of professionals and organizations.

For case studies of emerging and existing green and greening organizations, see Appendix C.

C. Current Green Job Estimates for the Region

More than a dozen major reports on green jobs and the green economy have been released by national organizations in the wake of the housing and banking crises in 2008. There is no single, widely-accepted

source for defining or estimating green job growth, but at least one major recent study ranks the Chicago region 6th in the nation among 100 metro areas in existing and projected jobs (U.S. Conference of Mayors, 2008; see table below). The same report also indicates that the Chicago region has more jobs in industries linked to energy and building retrofits than most U.S. cities. Initial estimates of green jobs are relatively small (just over 16,000 current jobs or 0.4% of total employment in the region), however the definition of green industries used in this report is relatively narrow – limited primarily to renewable energy and alternative fuel production and some sectors relating to building retrofits. It does not include any assumptions about greening of other existing sectors.

Top 100 Current and Potential Green Jobs Ranked by Metropolitan Area			
		Existing 2006	New Through 2038
1	New York-Nrthrn New Jersey-Lng Islnd, NY-NJ-PA (MSA)	25,021	197,971
2	Washington-Arlington-Alexandria, DC-VA-MD-WV (MSA)	24,287	192,165
3	Houston-Sugar Land-Baytown, TX	21,250	168,136
4	Los Angeles-Long Beach-Santa Ana, CA	20,136	159,321
5	Boston-Cambridge-Quincy, MA-NH (MSA)	19,799	156,660
6	Chicago-Naperville-Joliet, IL-IN-WI (MSA)	16,120	127,545
7	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD (MSA)	14,379	113,772
8	San Francisco-Oakland-Fremont, CA	13,848	109,570
9	San Diego-Carlsbad-San Marcos, CA	11,663	92,285
10	Pittsburgh, PA	9,627	76,174

Source: *The United States Conference of Mayors, "U.S. Metro Economies: Green Jobs in U.S. Metro Areas."* (October 2008)

This report supports a broad definition of green economic development that matches the region's diverse economic base. The green economy for the Chicago region includes emerging green sectors in which Chicago has some competitive advantages: green energy, green buildings and waste reduction. Water and waste water treatment and conservation is another important emerging green sector where Chicago may also have some existing competitive advantages but this will require more research.² The green economy for the Chicago region will also be comprised largely of the greening of other existing industries that have learned to survive and thrive in the midst of carbon constraints and resource scarcity.

The largest industries in the region based on employment levels include: elementary schools, eating places and hospitals.³ Key industries for creating wealth in the region (industries with export potential

² Food processing is an area where Chicago has existing strength but potential for growth linked to urban agriculture and local food systems is the subject of a separate study and report by CMAP.

³ Northern Illinois Data Center, 2003 data for 8-county Chicago-Joliet-Naperville IL Metropolitan Division found at www.nibidc.com/dbs/business/industry/chicago.htm.

and recent strong growth) include: Metal & Machine Manufacturing (steel product manufacturing from purchased steel); Specialized Chemical Manufacturing – paint, coating & adhesive manufacturing; and Transportation – support activities for rail and freight transportation arrangement. These key industries, as well as the rest of the region’s economic base, must be greener or their survival will be jeopardized.

D. Green Job Outlook for the Chicago Region

Some cities such as Chicago are just starting to create more specific job creation projections linked to green policies and programs. The United States Conference of Mayors report predicts substantial growth (to more than 127,000 jobs) for the Chicago metro region in the next 30 years (by 2038) provided that policies relating to carbon reduction and energy efficiency are adopted and implemented widely. Other national reports estimate faster growth based on investment in a broader range of industry sectors. One estimates that 83,710 jobs will be created in Illinois in the next two years based on an assumption of Illinois receiving a \$4.4 billion share of \$100 billion in green economic investment nationwide. (Pollin) The Chicago metro share would be a significant portion of the Illinois total but is not broken out. This is a top-down stimulus-style forecast model but is worth discussing to establish a reasonable range of what is possible. Bottom-up estimates like the U.S. Conference of Mayors approach may underestimate job creation potential due to a narrow definition and exogenous factors like a macroeconomic stimulus shifting the labor market.

Available manufacturing job estimates for Illinois are based in part on the state’s high energy usage and the number of existing manufacturers that already make products similar to those required by the renewable energy sector as determined by their 6-digit NAICS (North American Industry Classification System) codes. The latter is illustrated in the table below, produced by the Blue Green Alliance, a national partnership of labor unions and environmental organizations with a mission of expanding the green economy through global warming solutions and advancing workers’ rights. The data source for the table was the Renewable Energy Policy Project (REPP), a research and advocacy organization for renewable energy technology. These figures are from 2006 and assume that the United States moves to stabilize carbon emissions by adding 185,000 MW of new renewable projects each year over 10 years beginning in 2006. For such an investment, Illinois is projected to see 56,579 new manufacturing jobs over the course of the effort.

Location	# of Firms	Jobs Wind	Jobs Solar	Jobs Geothermal	Jobs Biomass	Jobs Total
Illinois	2,289	30,010	19,298	3,396	3,875	56,579
Indiana	1,321	25,180	7,485	3,191	3,365	39,221
Wisconsin	1,331	25,179	4,943	2,037	2,974	35,133
Michigan	2,050	24,350	6,644	1,502	2,281	34,777
Missouri	785	10,260	7,532	2,907	2,097	22,796
Minnesota	1,070	9,246	5,238	1,477	2,444	18,405
Kansas	425	3,934	5,430	719	1,408	11,491
Iowa	457	4,914	2,889	648	779	9,230
Washington	790	3,902	3,190	618	852	8,562
Nebraska	200	2,817	2,368	294	731	6,210
South Dakota	109	2,253	64	944	217	3,478

Manufacturing Jobs and Investment Potential for 185,000MW Investment in Various Renewable Energy Systems. Source: Blue Green Alliance, "Illinois' Road to Energy Independence: Building on Job Growth in Renewable Energy Component Manufacturing" via data from Renewable Energy Policy Project, 2006.

Using a similar methodology, data from REPP for existing businesses in Illinois was mined to determine the potential number of renewable energy component manufacturers in the 7-county region (see Appendix A). The largest numbers for the region by far is in Cook County. Currently supplier surveys are underway to determine the potential and needs for transitioning these businesses into renewable energy component manufacturing, but more resources are needed to do targeted outreach particularly in Cook County.

Due to the large number of existing and proposed wind farms in Illinois, construction, installation and maintenance jobs have special promise in the wind industry in the relatively short term. While many of these sites are outside of the 7-county region, several are located within commuting distance from region and the job creation potential cannot be discounted.

Chicago already has attracted executive offices for more than half a dozen global energy companies and is likely to continue to attract additional direct and indirect white collar professional service jobs. World Business Chicago attributes its success in attracting North American headquarters to Chicago to its easy access and convenience to global markets, a tolerant, culturally-diverse city, world-class business resources and quality of life.⁴

D. Programs, Regulations, and Incentives

Programs, regulations, and incentives to support emerging green sectors and greening of existing sectors have started to appear in the region, but to date they have not yet been a big factor in driving

⁴ These assets were listed in an unpublished January 2009 PPT presentation by WBC entitled "The Global Chicago: Business Center of North America."

green economic development. Most programs are voluntary and currently lack implementation plans, financial resources, technical assistance, and majority participation. Regulations and incentives are few and fragmented across the region, and are often not enough to be drivers. Education and marketing of existing programs and development of more specific implementation plans could change their impact on the region's economy in the short-term and longer-term future.

The following is a sampling of the more prominent programs, regulations, and incentives currently in the region. The role of the State of Illinois is especially important for effective implementation of green economic development in the region, so we have devoted a larger section to those initiatives. The other programs, regulations, and incentives listed are still in the early stages of development, but they are also key building blocks for developing regional green economic development goals and strategies.

State Programs, Policies, and Incentives

Overview: The call to action at the 2009 American Wind Energy Association conference at McCormick Place was for a national Renewable Energy Standards, or federal legislation that would require 25% of power to be derived from renewable sources by 2025. Illinois is already one of the states that have adopted this standard. The trick now is to help local renewable energy producers understand exactly how the standard will be implemented and how they can take advantage of it. Few people in Illinois have ever heard of the Illinois Power Agency, the new state agency created in 2007 as a result of rate relief regulation. The IPA has responsibility for oversight of utility company purchases of renewable energy under the state's Renewable Portfolio Standard. Monitoring of implementation plans for achieving annual targets and education on progress is needed to ensure that important new energy policies benefit the Chicago region and that they are updated when necessary to respond to advances in technology and improved competitiveness of non-wind energy production. Given the new state preference for purchasing wind power and the growing number of wind equipment manufacturers in the region, there is also a need to monitor and promote changes in current state economic incentives that currently support small solar but not small wind. Small turbines or rooftop systems are becoming more common, begging the question of why state incentives are currently limited to solar systems. Local foundations such as the Illinois Clean Energy Community Foundation could perhaps lead the effort to disseminate information and evaluate existing policies and incentives relating to renewable energy and energy efficiency.

Policies

- **EEPS and RPS.** Senate Bill 1592 was signed into law in August 2007 creating the Energy Efficiency Portfolio Standard (EEPS) and a Renewable Portfolio Standard (RPS). The EEPS will require Illinois utilities to reduce overall electric usage by 0.2% of demand in 2008, escalating to 2.0% by 2015. The RPS will require utilities to supply 2% of their power from renewable energy sources by 2008 for certain eligible customers, escalating to 25% by 2025. This will drive wind development in Illinois regardless of the "fair" wind potential rating. In order to meet the targets of EEPS and RPS, utility companies have enacted programs to increase efficiency and renewable portfolio.

Net Metering. The ability for wind, solar and biomass users to sell power back into the grid is an important incentive for investing in small-scale systems. In Illinois, net metering is available to electric customers that generate electricity using solar energy, wind energy, dedicated energy crops, anaerobic digestion of livestock or food processing waste, hydropower, and fuel cells and microturbines powered by renewable fuels. Systems up to 40 kilowatts (kW) in capacity that are intended primarily to offset the customer's own electrical requirements are eligible. While Illinois's investor-owned utilities and alternative retail electricity suppliers must offer net metering, the state's municipal utilities and electric cooperatives are generally not required to do so. (DSIRE) ComEd has already announced plans to expand its Smart Ideas programs by installing more “smart” 2-way metering boxes. Monitoring and information on the roll-out of this program and net metering rules is needed.

Incentives

- **Grants and Rebates: Illinois Renewable Energy Resources Program**, Illinois Department of Commerce and Economic Opportunity (DCEO).
http://www.commerce.state.il.us/dceo/Bureaus/Energy_Recycling/Energy/. Supports renewables through grants, loans and other incentives administered by the Illinois Department of Commerce and Economic Opportunity (DCEO). The funding mechanism was established for 10 years in January 1998. In August 2007, funding was extended through December 12, 2015.
 - Renewable Energy Business Development Grant Program – Targets projects that develop and expand the renewable energy sector and corresponding supply chain while improving the economy of the State through new business development.
 - Solar Energy Incentive Program
 - Solar PV incentives
 - Up to \$3.00 per watt (DC) of installed photovoltaic capacity up to \$250,000 on a facility that targets, registers for, and achieves LEED-Silver, Gold, or Platinum certification.
 - Up to \$3.25 per watt (DC) of installed photovoltaic capacity up to \$250,000 for an innovative solar photovoltaic installation.
 - Solar Thermal incentives : Up to 30 percent of eligible project costs per project, with a maximum incentive amount of \$250,000
 - Solar Energy Rebate Program: Rebate of 30% of cost (up to \$10,000) of solar PV systems: rated design capacity of at least 1 kW; or Solar-thermal systems designed to produce at least 50,000 Btus per day or contain at least 60 sq. ft. of collectors
 - Biogas and Biomass to Energy Grant Program (funded by Renewable Energy Resources Trust Fund)

- Renewable Fuels Development Program - grants for the construction of new biofuels production facilities in Illinois. The program is specifically designed to increase biofuels (ethanol and biodiesel) production in Illinois.
- E85 Infrastructure Development Program (funded by IL Clean Energy Community Foundation, see below)
- Economic Development for a Growing Economy (EDGE). Grants and low-interest loans for major new plant investment.
- **Tax Incentives (abatements, deductions, credits, etc.)**
 - DCEO Commercial Wind Energy Property Valuation
 - DCEO Special Assessment for Solar Energy Systems
- **Private Incentives**
 - Renewable Energy Credits for Small Solar PV Energy Producers through the Illinois Renewable Energy Aggregation Program (RECAP). <http://www.illinoissolar.org/>. The Illinois Solar Energy Association (ISEA) provides a direct incentive for Renewable Energy Credits produced by members' solar photovoltaic systems by offering its members an opportunity to earn \$0.06 for every kilowatt-hour produced through a partnership with Community Energy, an Iberdrola Renewables company.
 - Illinois Clean Energy Community Foundation Grants. <http://www.illinoiscleanenergy.org>. Grants to local government and nonprofit organizations for projects that develop renewable energy resources and improve energy efficiency. Award amounts are considered on a case by case basis based on cost effectiveness of the project, innovation, other funding sources, and other factors.
 - State Treasurer's Office – Cultivate Illinois Green Energy Program. <http://www.treasurer.il.gov/programs/cultivate-illinois/green-energy.aspx>. Below-market interest for borrowers who finance purchase or installation of energy efficient and renewable energy equipment with participating lenders.
- **Technical Assistance and Other Incentives**
 - Illinois Conservation and Climate Initiative – Methane Capture
 - Illinois Renewable Energy Association
 - Illinois Solar Energy Association
 - Procurement Technical Assistance Centers for small business interested in selling products to government agencies. (SBDC's at Chicago State and Governors State).

Chicago Climate Action Plan

The result of broad and ambitious research by the Chicago Climate Task Force, the Chicago Climate Action Plan outlines five strategies, which are broken into 26 actions for mitigating greenhouse gas emissions and nine actions to prepare for climate change. The Chicago Climate Action Plan details steps for both organizations and individuals to take action. Currently the City of Chicago is working with partner organizations on implementation plans for the actions.

<p>Chicago Climate Action Plan Strategies <i>For more details on these strategies, including greenhouse gas emission reductions associated with specific actions, see Appendix B.</i></p>
<ul style="list-style-type: none"> • Energy Efficient Buildings • Clean and Renewable Energy Resources • Improved Transportation Options • Reduced Waste and Industrial Pollution • Adaptation

Source: Chicago Climate Action Plan, www.chicagoclimateaction.org (accessed 14 May 2009).

Metropolitan Mayors Caucus’ Greenest Region Compact

In July 2007, member mayors attending the Metropolitan Mayors Caucus’s business meeting unanimously approved a motion to recommend the region’s nine Councils of Government and the City of Chicago approve adoption of the Caucus’s Greenest Region Compact. The Greenest Region Compact is a voluntary initiative to improve the region’s air, water and land, reduce greenhouse gases, minimize waste, and reduce energy consumption through a series of environmental actions. Three priority strategies have been identified: residential water conservation education and regulation, e-waste recycling, and CFL bulb distribution. As of May 2009, over 100 mayors have signed onto the Compact. A workbook is available to assist municipalities in implementing the strategies recommended in the Compact.

Metropolitan Mayors Caucus’ Greenest Region Compact Strategies	
Priority	<ul style="list-style-type: none"> • Residential water conservation education and regulation • E-waste recycling • CFL bulb distribution
Air	<ul style="list-style-type: none"> • Diesel retrofits • Transit education • Bus shelters and bike racks
Energy	<ul style="list-style-type: none"> • LED traffic signals • Municipal green power purchase
Land	<ul style="list-style-type: none"> • Tree planting programs
Waste	

- Construction and demolition debris recycling
 - Paint recycling
 - Residential curbside recycling
- Water**
- Stormwater best management practices

Source: Metropolitan Mayors Caucus, "Greenest Region Compact."

www.mayorscaucus.org (accessed 15 May 2009).

ComEd Renewable Energy and Energy Efficiency Programs

Most of the new green jobs that are expected to emerge in the next decade are linked to energy use and conservation. Electricity and increased use of renewable power is especially important to new jobs linked to the wind and solar industries. Conservation of electricity and natural gas are also key drivers of growth in the green building products and services (such as small-scale geothermal, solar, etc.). Utility companies in the region such as ComEd are therefore major players in the region's new green economy. ComEd began purchasing green power in 2007 and unveiled its Smart Ideas program in 2008. Dissemination about these and other programs that are likely to emerge over the next decade will be important in supporting green power generation and building retrofits.

ComEd Renewable Energy and Energy Efficiency Programs*	
Program	Description
Purchase of wind energy and renewable energy credits (RECs)	Purchase of RECS through competitively bid power purchase agreements. ComEd solicits bids on annual basis (usually due in the spring of each year). The initial renewable energy portfolio in 2007 was roughly 300MW and is scheduled to increase by 1-2% per year until the year 2025.
Smart Ideas	A portfolio of energy efficiency programs available to ComEd customers, including incentives to building owners who are interested in implementing energy efficiency projects.
Prescriptive incentives	Prescriptive incentives are available for energy efficiency equipment upgrades and improvements including: lighting, cooling, refrigeration, and motors. Incentives are paid based on the quantity, size, and efficiency of the equipment. Incentives, tools, and tips, are provided to help save money on your energy bill. Enrollment is currently closed for the Prescriptive and Custom Smart Ideas for Your Business incentives. ComEd will begin accepting applications again on June 1, 2009. Information on how to apply can be found at: http://www.comed.com/businesssavings/programsincentives/HowtoApply.htm
Business Energy Analysis tool	A self-assessment tool for calculating energy use for small business. http://www.comed.com/businesssavings/energyanalyzer/energytool/
*Note: This summary provides a sampling of programs that are being offered by ComEd through their website at www.comed.com . It is not intended to be a complete resource guide and is subject to change over time.	

Although energy service companies are increasingly engaged in providing financing for energy efficiency improvements themselves, with loans repaid from gas and electric savings, some improvements with longer payback periods may require additional outside financing. However, given the current tightening

of credit markets, government subsidies (interest write-downs) or loan guarantees will be important in expanding financing options for capital improvements. Government programs like a pilot program announced by the Illinois Treasurer's Office in 2008 can help.

Suburban Efforts

Several suburban municipalities in the region are currently developing or implementing sustainability plans. The City of Aurora, the second most populous city in Illinois, is in the process of implementing sustainability initiatives that include stormwater management, sustainable riverfront planning and development, LEED certified public buildings, transit-oriented development, construction and demolition recycling, and green fleets. The City of Elgin has established a Sustainable City Master Plan and is currently forming working groups to address nine key areas of the plan.⁵ Highland Park is also in the preliminary stages of creating a sustainability plan.

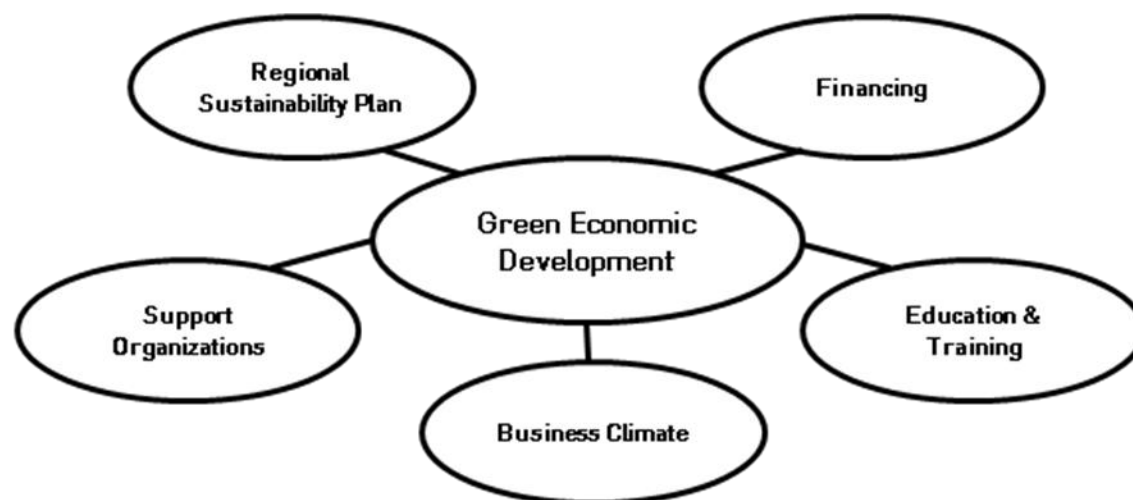
Evanston adopted a Climate Action Plan in November 2008, and in April 2009 the City accepted a proposal from Citizens for a Greener Evanston to develop a wind energy farm off the coast of Northwestern University's campus.⁶ While the project is still in need of feasibility studies and financing, the public announcement of such a plan demonstrates a commitment to pursue bold ideas to reduce greenhouse gas emissions and increase energy independence.

In Chicago's south suburbs, the South Suburban Mayors and Managers Association has been actively reaching out to wind component manufacturing businesses and the freight industry. Additionally they have created a partnership with Robbins Community Power to reactivate former waste-to-energy plant as a new biomass energy plant using primarily wood waste.

⁵ <http://www.cityofelgin.org/CivicAlerts.aspx?AID=626&ARC=687>

⁶ <http://media.www.dailynorthwestern.com/media/storage/paper853/news/2009/04/17/City/Evanston.Proposing.Wind.Turbines.On.Lake-3715450.shtml>

Challenges and Opportunities



This section provides summary information, organized into five categories, about the challenges and related opportunities for both general green economic development and specific existing and emerging green industries.

Challenge 1: Lack of a Regional Sustainability Plan

“We’ve got about 5,000 days to figure it out.” – Joel Makower, Chairman/Executive Editor, Green World Media, Inc.

That’s just over 13 years before the planet’s environment is damaged beyond repair.

“Where’s the urgency,” Makower asks. *“Where’s the audaciously big thinking?”*

Climate change is no longer an issue that can simmer on the back burner. By the year 2021—just 5 years after the 2016 Olympics—irreversible damage to the environment will have occurred. Although a number of major corporations and universities have made climate commitments, it appears government is lagging, not leading, in most parts of the region. Efforts equal to those to capture the 2016 Olympics will be needed to reduce our region’s carbon footprint before it is too late. Greater commitment is needed from local government leaders. Only 28 mayors in the region have signed onto the U.S. Conference of Mayors Climate Protection Agreement, and 91 municipalities have signed onto the Metropolitan Mayors Caucus Greenest Region Compact to date. The Chicago Climate Exchange presents an opportunity to measure progress on this front in terms of the number of Exchange members from the 7-county region and the number of metric tons sold on the Exchange by these members each year.

Progress in the region’s transformation to a greener economy should also be measured in terms of the number and quality of green businesses and jobs in the region. Standards for what constitutes a green business for emerging green industries and key existing industries will be needed to establish a baseline for measuring growth.

Defining what we mean by green. As mentioned in “Existing Conditions,” many definitions exist and range from the narrow to broad. Some reports define green jobs as only those involving the

manufacture and servicing of green energy and energy efficiency products – but is a wind turbine manufacturing company that uses polluting products and processes, or a weatherization contractor that employs day laborers with poor wages and no benefits, truly green? Increasingly, “green business” is self-defined through marketing, or defined by voluntary programs requiring only self-reporting – but as green infiltrates mainstream thinking, misrepresentation of facts (“greenwashing”) poses a threat to real progress. Certain third party certifications have proven effective at driving demand in particular sectors by vouching for the “green”-ness of a business through rigorous testing, verification, and reporting; however, such certifications and standards do not currently exist for every industry sector, they may prove cost prohibitive for small businesses to pursue, and they can sometimes be so prescriptive as to hinder innovation.

Data gaps and overlaps. In order to come to terms with a definition for green economy in the region, we must also consider the existing data sources, which are problematic in their geographical boundaries and industry categories. The Census Bureau’s definition of the Chicago region excludes Lake County and includes two additional fringe counties (DeKalb and Grundy) outside the 7-county region, and so is skewed on the rural side. Another problem is that existing data sources don’t identify industries in terms that make it easy to determine if they are green. There is no category for manufacturing renewable energy equipment or energy efficient products. Understanding true economic strengths and green job potential will require additional on-going research and data collection that goes beyond the scope of this report and occurs at regular intervals over time.

OPPORTUNITIES:

- Create a regional sustainability plan, with green industries, green business, and green parts of businesses defined in terms that can be baselined and tracked on an ongoing basis for the region.
- Define standards for green business or parts of green business for each industry sector
- Develop outreach and survey tools for confirming if businesses meet green standards for each sector.
- Generate information (i.e. lists or directories) of existing and potential green businesses in the region by sector. Consider engaging/partnering with industry associations for each sector.
- Track progress and update standards on annual or biannual basis.

Challenge 2: Financing for Green Business

Local Venture Capital. Capital is crucial to the expansion of renewable energy. A typical utility-scale wind farm costs \$20 – 40 million to start up. Wind turbine manufacturers have experienced a slowdown in business since the freeze up of credit markets last fall. Venture capital investment in clean tech reached unprecedented levels in 2008 – \$7.6 billion, double the previous year, according to Greentech Media (Makower 2009) – with the largest share of investment dollars supporting next-generation biofuels, wind and solar power and fuel cells. The Midwest is just getting started in forming its own

networks of alternative energy and clean tech investors, spearheaded by local energy magnates such as Michael Polsky. The University of Chicago Booth School of Business' Polsky Center for Entrepreneurship hosted the 2nd annual Midwest Alternative Energy Venture Forum in the fall of 2008. The keynote speaker was flown in from California and didn't linger long to talk to Midwest entrepreneurs. The challenge and opportunity for the region will be to continue to grow its own angel and venture capital investor network.

Government and private-sector financial support for R&D and demonstration projects is especially important for the green energy sector, since technology breakthroughs are needed to lower production costs and reduce dependence on subsidies. Similarly for waste, waste-to-energy has advantages for the region, but also faces challenges of high capital cost for relatively untested technologies. Financing incentives, R&D funding and demonstration projects could lead to breakthroughs in this sector within the next 10 years, with potential to catapult these industries to the forefront. Even for greening of existing sectors, new capital funding sources and other financing sources (New Market Tax Credits, for example) are needed to support innovation and to implement alternative product technologies and services at scale.

Loan Guarantees. The federal stimulus package provisions are a fleeting, if possibly important, springboard – if they amount to enough money to be noticeable in terms of what is needed in the way of green energy investments. A new \$6 billion infusion of funding for the Innovative Energy Loan Guarantee program announced in February 2009 is already proving to be an important stimulus for renewable energy investment in Chicago and nearby areas. In March 2009, clean tech VC firm Rockport Capital Partners announced that the U.S. Department of Energy had tentatively awarded its first alternative-energy loan guarantee, breaking a four-year logjam in the federal loan program. The \$535 million guarantee will cover about 75% of the cost of expansion for Fremont, California-based Solyndra Inc. Solyndra plans to expand its production of photovoltaic panels.

On Earth Day 2009, Exelon, parent company of Commonwealth Edison, announced plans to build a 10 megawatt solar PV plant on Chicago's South Side on 39-acres of city-owned brownfield property. The plan is contingent, however, on Exelon getting a federal loan guarantee for up to 80% of its costs. Earlier in April, Chicago-based Invenergy, LLC, announced plans to expand its Grand Ridge wind farm in LaSalle County to reach 110 megawatts by the end of 2009, with stimulus funding in the form of Treasury Department grants (new 30% cash Investment Tax Credit option in lieu of the Production Tax Credit) and Department of Energy loan guarantees. Although no guidelines are yet available for the new loan guarantee funds, it appears that loan guarantee funds are quickly being committed to very large projects that are "shovel ready." Many smaller renewable energy developers have indicated the need for access to such guarantees as well if their projects are to move forward.

Other State and Local Financing Programs. Real estate and business expansion financing is available to a wide range of businesses in disadvantaged areas through New Markets Tax Credits. For example, the City of Chicago's \$100 million allocation of New Markets Tax Credits (through the Chicago Development Fund) may be used to provide capital at below market terms to industrial, commercial, institutional or mixed-use real estate projects low-income areas within the City.

Green Bank Loan Programs. Traditional private-sector banks are also launching initiatives to support clean energy, climate mitigation and green building. In 2008, Bank of America announced it would direct \$20 billion to help its corporate, customers pursue green business opportunities. Citigroup said it would devote \$50 billion toward projects that reduce carbon emissions. (Makower 2008) Smaller Chicago-based banks are also participating in a new state-subsidized green loan program. Harris Bank is one Chicago bank partnering with the Illinois State Treasurer’s Office on the new Cultivate Illinois Green Energy Program, in which the State Treasurer’s Office secures below-market interest rates for borrowers who finance their purchase or installation of energy efficient and renewable energy equipment with participating lenders.

OPPORTUNITIES:

- Continue to grow the angel and venture capital investor network in the region to a level that will support and sustain green tech ventures.
- Promote existing loan guarantee programs and develop additional guarantee programs that could support smaller green businesses.
- Target other public and private loan programs to favor green business or investment.

Challenge 3: Organizational Infrastructure for Green Business

The region has a broad range of existing academic and nonprofit support centers focusing on specific issues (such as world business relationships) or types of businesses (such as manufacturing centers or small business development centers). There are, however, overlaps and gaps and, as yet, very limited comprehensive support organizations for green industries or businesses. Existing support organizations focus on specific sectors such as wind (Wind For Illinois), solar (Illinois Solar Energy Association), and green buildings (the Chicago Center for Green Technology and U.S. Green Building Council-Chicago Chapter) or on providing networking and education opportunities (such as the Chicagoland Sustainable Business Alliance). Some industries such as manufacturing have fairly well developed support organizations in the region (e.g. Chicago Manufacturing Center and Chicago Manufacturing Renaissance Council). None are focused specifically on providing services to green businesses or greening existing businesses, but instead on efficiency and competitiveness.

Support Networks for Small and Medium-Sized Green Businesses; Need for Leadership and Coordination. Green business in the region is currently supported only by organizations seeking to improve effectiveness and competitiveness, and none on helping businesses enter and develop new green markets, navigate the complexities of greening the supply chain, or plan strategically around existing and proposed incentives and game changing policies. Large corporations have the ability to hire a wide range of professional consultants to help them navigate new policies, incentives and overcome issues relating to scale. Small and medium-sized businesses often look to government and nonprofit sectors for support. The problem is the support network is highly fragmented – itself a product of a diverse economy and a fragmented system of local government. There is no existing one-stop shop for green economic development or green business development. New federal stimulus money provides an

opportunity for states, counties and cities to establish new energy offices. Coalitions of smaller cities could pool their resources or apply jointly for assistance from county or state offices. There is a need for more dialogue in the region on the need for a coordinated support network for green industries and businesses.

Need for Renewable Energy and Energy Efficiency Support Center. New federal block grant money provides an opportunity to establish both larger regional offices and also smaller sub regional offices to administer renewable energy and energy efficiency programs and provide a broader range of services and information. These offices could also serve as clearinghouses for information and training opportunities provided by other existing support organizations. Specific support groups exist for wind and solar production and component manufacturing. Increasingly, foreign consulates are also offering programs and networking opportunities in the region to introduce foreign companies to local partners. However, these groups and events are currently fragmented and could benefit from having a one-stop shop in the region.

Scale: Challenges for Small-Scale Energy Producers and Equipment Manufacturers; Need for Aggregators and Integrators. Scale – and whether there will also be room in the green economy for smaller-scale energy producers and equipment manufacturers, or resource recovery businesses – is a challenge that touches both emerging green sectors and existing sectors that are shifting into new green product lines. For example, many small manufacturing businesses lack the capability to make precision parts for major wind turbine manufacturers. Local manufacturing support groups are working to identify larger suppliers that could serve as integrators for smaller-scale suppliers in the region and provide business development assistance in helping smaller suppliers retool. Scale is also an issue in collecting waste from smaller-scale sources. New markets are developing for biomass and food waste, but cost effective systems for collecting and aggregating these specific waste streams from many small generators need to be developed. There is a need in many emerging green industries for intermediaries or distributors who can help integrate or aggregate energy, products or raw materials for smaller businesses or generators of energy or waste.

Global Competition and Lack of Incentives for Existing Manufacturers. Manufacturers of renewable energy equipment face the same challenges as other manufacturers, plus additional sensitivity in selling precision parts to global companies with millions at risk. Scale is also a huge issue for this sector – how to help small energy generators and small manufacturers tap into new incentives and supply chains. Many will need help in forming partnerships with other wind farm developers and equipment suppliers to achieve the quality, scale and price that the wind industry demands.

OPPORTUNITIES:

- Create, coordinate, and publicize support networks to help small and medium-sized green businesses access public- and private-sector technical assistance as well as peer-to-peer knowledge.
- Create a regional support center for the renewable energy sector.

- Support the formation of aggregators and integrators to achieve economies of scale for the manufacturing shift to green product lines.

Challenge 4: Business Climate: Deficiencies in Incentives, Policies, Industry Standards, and Regulations.

Green businesses (increasingly foreign-based businesses) and entrepreneurs are attracted to locations with strong commitments to resource protection, strong financial and organizational support for emerging green industries, and a competitive business climate. Business climate is a general term that encompasses both “carrots” (incentives) and “sticks” (regulations) and the ease with which businesses can obtain financing, subsidies, sites, necessary permits, and a trained workforce. The Chicago region is just beginning to grapple with the different facets that support or inhibit new green business.

Competition. Other cities and regions are courting the same green industries that have promise for Chicago. Competition from other Midwest states seeking to capture jobs in manufacturing wind turbine components is especially intense. The Chicago region can still be effective in attracting and nurturing green business but may need to step up the level of subsidies for some sectors to compete against other states that are aggressively investing in attraction of wind and solar plants. The following table illustrates that while Illinois is competitive in incentives per plant, other states are doing more deals and clearly investing bigger dollars in their programs than Illinois.

Company	City	State	Workers	Investment	Subsidies
VestasAmericas	Brighton	CO	1,350	\$290,000,000	\$8,500,000
VestasAmericas	Pueblo	CO	450	\$240,000,000	\$23,800,000
VestasAmericas	Windsor	CO	420	\$60,000,000	\$1,100,000
AccionaWindpower	WestBranch	IA	130	\$23,000,000	\$4,850,000
ClipperWindpower	CedarRapids	IA	250	\$50,000,000	\$3,150,000
SiemensPowerGeneration	FortMadison	IA	380	\$43,000,000	\$12,500,000
TPIComposites	Newton	IA	330	\$56,000,000	\$6,600,000
TrinityStructuralTowers	Newton	IA	140	\$21,000,000	\$1,280,000
TrinityStructuralTowers	Clinton	IL	140	\$15,000,000	\$2,000,000
Wanxiang	Rockford	IL	60-240	N/A	\$2,000,000
EvergreenSolar	Midland	MI	100	\$55,000,000	\$5,700,000
UnitedSolarOvonic	BattleCreek	MI	350	\$260,000,000	\$96,900,000
UnitedSolarOvonic	Greenville	MI	400	\$126,000,000	\$37,000,000
FirstSolar	Perrysburg	OH	834	\$71,500,000	\$20,960,000
Xunlight	Toledo	OH	160	\$52,000,000	\$14,900,000

Source: All data except those for Wanxiang were excerpted from Good Jobs First, “High Road or Low Road? Job Quality in the New Green Economy,” Table 1: Examples of subsidized wind and solar manufacturing plants (p.13). February 3, 2009. The source for the Wanxiang data is RRStar.com, “Rockford City Council unanimously approves solar farm.” February 18, 2009.

Incentives. Green energy, building improvements and products often involve higher upfront cost than non-green alternatives. Economic incentives are important in leveling the playing field and creating demand while markets develop and lead ultimately to lower prices. Incentives are more important in some sectors than others. Small wind, solar, biomass or geothermal have far lower upfront capital cost than utility scale projects but most building owners are still reluctant to invest in green building improvements without incentives due to long payback periods. Incentives are important in driving demand in the green building sector as well. A major infusion of federal stimulus money will soon be available for energy efficiency improvements in public buildings, some private buildings and job training.

Education and Assistance in Accessing Incentives. Understanding new policy drivers and navigating the complex web of new incentives is not easy, and few entrepreneurs have the time to do this. Very few of the green businesses or projects that are featured as case studies in this report were pursuing incentives or knew much about them. Effective incentive programs will also require education and assistance in accessing them.

Legislation and Regulatory Streamlining. Red tape can sometimes make Chicago or other more urbanized parts of the region unappealing for emerging green industries or key existing industries. There are a broad range of ordinances that could be adopted to support emerging green industries. Zoning and building code reform is most important to the emerging green sectors as many do not have standards for new uses like wind turbines or building material reuse centers. Updating codes to add clear standards for new green uses is needed to recruit green industry.

For example, for green energy, legislative reform for this sector is needed primarily to resolve red tape and delays in zoning and permitting for new uses and structures (such as wind farms and wind turbines) that are not found in existing codes. For waste, new businesses relating to waste reduction are not found in most zoning and licensing codes. “Deconstruction” is a different business than “demolition.” “Commercial composting” is different than a “waste transfer station” or a recycling center. Zoning and permitting codes may need to be updated to include definitions and standards for new uses and expedite approvals. For buildings, legislation – primarily building code reform – is also needed to create preferences and incentives for new energy- and water-saving technologies. Additional ordinances that could be adopted to support green sectors or greening of existing sectors might include green purchasing ordinances and other ordinances discussed in the “Key Policies and Market Trends” section of the Introduction.

Industry-Specific Standards and Incentives. The need for industry-specific green business standards and incentives is increasingly apparent as green practices and sustainability have gained a mainstream market presence in the last few years. The rising tide of green—and with it, misrepresentation (greenwashing)—demands third-party standards for defining and certifying industry best practices. Another benefit of industry-specific standards, particularly for more mature emerging green business sectors, is the influence on permitting—that is, the adoption of available industry standards by permitting agencies—would expedite the implementation of emerging green practices that do not fit into traditional zoning codes and ordinances.

In certain sectors such as green building, standards such as the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system have enjoyed both policy and market uptake in many major metropolitan areas (including Chicagoland) and some non-metropolitan areas. On the policy and incentive front, many municipalities have adopted LEED certification as a policy or incentive for new public buildings, and some have done so for existing public buildings or even new private buildings. In the private sector, building tenants around the country are beginning to demand LEED-certified spaces from landlords, and LEED project experience is a highly marketable skill. In the material recovery industry, new industry standards for handling some specific types of waste are also needed. For example, some ordinances are requiring recycling rather than disposal of construction waste, but don't provide any guidance for crews on how to handle or dispose of potentially hazardous building materials such as lead-based paint or asbestos laden materials. Similar standards for weatherization contractor services, green hospitals, composting facilities—just to name a few—would encourage companies to verifiably improve their services for market differentiation and/or streamline regulatory processes.

OPPORTUNITIES:

- Increase public incentives for capital-intensive emerging industries such as renewable energy production.
- Improve the effectiveness of incentive programs by pairing them with education and assistance programs to help businesses understand and access them.
- Update codes to incorporate clear and current standards for new green products and processes.
- Develop industry-specific green standards to support market differentiation and streamlined permitting.

Challenge 5: Understanding the New Low-Carbon Economy: Deficiencies in Education, Information, and Training

Understanding New Federal Carbon Cap & Trade Policy. When a price is established for the ability to emit greenhouse gas emissions, some businesses will have to account for and adjust their operations to meet their assigned carbon emissions cap. Other businesses can take advantage of this new policy by adopting reduced carbon strategies and selling those reductions to other businesses in need of reductions through the carbon market that results from cap and trade legislation. Economic development decisions will also have to account for the carbon intensity of economic activities. Many possible permutations of a federal system are being debated, but there is consensus that greenhouse gases will be regulated. The policy generate a host of new opportunities for new business growth, increases in efficiencies in existing sectors, and innovation in both emerging and existing green sectors.

Understanding state energy mandates: RPS and EEPS. The **Illinois Renewable Portfolio Standard (RPS) and Energy Efficiency Portfolio Standard (EEPS)** are the most significant drivers of growth in renewable power generation and building retrofitting in the region and other parts of Illinois. Economic

development professionals need to understand the process for selling renewable power to ComEd so they can assist businesses in their efforts to sell renewable power and evaluate whether changes in the standards or benchmarks are needed.

Education and Information on How Local Environmental Policies Can Create Markets and Jobs. Some strong local environmental policies in the region have potential to spur investment and job growth in green sectors. Examples include Chicago's Construction & Demolition Waste Recycling Ordinance which has resulted in hundreds of new jobs in new C&D waste transfer stations, and the Chicago Climate Action Plan which is still emerging but is expected to create roughly 2,500 jobs relating to just the goal of retrofitting 50% of existing buildings to be more energy efficient.

Challenges/opportunities for renewable energy sector. Education, information and capital are much bigger issues for this sector than the other two due to the complexity of the new policies and incentives and the extraordinary upfront capital cost for wind and solar farms and biomass energy plants.

OPPORTUNITIES:

- Educate the business and economic development communities about the economic implications and opportunities of a resource constrained economy, with emphasis on carbon and water resources.
- Expand education to business and economic development communities about economic incentives for emerging green business and greening of existing businesses.

Specific Challenges Related to Emerging/Existing Sectors

- **Wind and solar conditions.** Wind and sun conditions are just "fair" in most parts of the Chicago region. The number of new construction and maintenance jobs will depend on whether there are places in and near the Chicago region where conditions are good enough to overcome the disadvantages of transporting energy from farther away. In general, Illinois is well positioned with its transmission infrastructure to overcome fair wind and sun conditions; however more information and resources are needed for assessing conditions on a site-by-site basis.
- **Contractor and workforce training.** The biggest challenge in the green building sector for the short-term future is a lack of trained contractors with a trained workforce to meet the emerging demand for energy efficiency retrofits. Industry standards, training and technical assistance are needed for the new army of contractors that will weatherize thousands of homes and retrofit hundreds of thousands of square feet of commercial and industrial space. These contractors need a trained workforce to achieve the environmental benefits anticipated by energy efficiency and climate action policies.
- **False pricing and perceptions regarding resource scarcity.** Other challenges and appropriate responses to them vary considerably for different types of buildings and services, and range from relatively cheap electric rates to the perception that this region has an endless supply of water.

Recommended Indicators

The indicators below are derived from CMAP's *GO TO 2040* Regional Indicators Project's preliminary tracking indicators list.⁷ In many cases CMAP's indicators have been modified to focus on the need to capture information specific to the growth of the green economy. Note that while we have indicated available data sources wherever possible, many of these suggested indicators require a consensus definition of "green" and therefore are currently unavailable.

Workforce

- Number of green jobs. *Consensus on definition and data collection or survey work needed.*
- Number of green jobs created or retained as a result of government subsidies. *Consensus on definition and data collection or survey work needed.*
- Average or median wages of green jobs by industry and occupation. *Consensus on definition and data collection or survey work needed.*

Business Environment

- Number of businesses offering certified green products or services. *Consensus on definition and data collection or survey work needed.*
- Number of businesses with third-party green certifications. *Consensus on definition needed; data available from certifiers.*
- Number of businesses with memberships in green industry associations or the Chicago Climate Exchange. *Available from green industry associations and CCX.*
- Private investment – number of private business loans for green business. *Available from limited sources, such as the State's Green Loan Program.*
- Private investment – number of private business loans made to minorities for green business. *Available from limited sources, possibly State's Green Loan Program or Small Business Association, cross-referenced with State or City MBE programs.*
- Productivity – gross regional product for green industries. *Consensus on definition needed; data available from Moody's.*
- Entrepreneurialism – number and percentage of small green businesses started and retained after 2 years. *Consensus on definition needed; data available from Moody's.*
- Entrepreneurialism – number and percentage of small green businesses, owned by minorities, started and retained after 2 years. *Consensus on definition needed; data available from Moody's cross-referenced with State or City MBE programs.*
- Number of equity investments in green business activities. *Consensus on definition needed; data needed.*

Education and training

- Degrees conferred in green technology fields. *Consensus on definition needed; data available from regionwide colleges, universities, and technical training programs.*
- Number of education institutions offering green certification programs for individuals. *Consensus on definition and data collection or survey work needed.*

Programs

- Number of municipalities & counties with sustainability plans with measurable goals. *Consensus on definition and data collection or survey work needed.*

⁷ <http://www.goto2040.org/indicators.aspx>

- Number of businesses participating in municipal/county sustainability programs. *Consensus on definition and data collection or survey work needed.*
- Number of certified green cities. *Consensus needed on definition; data may be available in the future from a certification program currently in development: ICLEI's STAR Community Index.*

Buildings

- Number of third-party certified green buildings (e.g. LEED Certified, Green Seal certified, ENERGY STAR rated). *Available from the U.S. Green Building Council, ENERGY STAR, Green Seal.*
- Number of green building permits issued. *Available from municipal building permit issuing offices, assuming there is a green building permit.*
- Percentage of municipalities committed to achieve green building certification (e.g. LEED, ENERGY STAR) for public buildings. *Consensus on definition and data collection or survey work needed.*

Innovation

- Number of green technology patents. *Consensus on definition and data collection or survey work needed.*

Funding/investment/lending

- Dollars of government resources assisting green business. *Consensus on definition and data collection or survey work needed.*
- Dollars of government resources assisting green economic development strategies. *Consensus on definition and data collection or survey work needed.*
- Volume of green home purchase (e.g. Chicago Green Homes or LEED for Homes Certified) and refinance loans. *Consensus on definition and data collection or survey work needed.*

Energy

- Energy consumption and source, by sector (e.g. buildings, transportation). *State-level data available from U.S. Department of Energy – Energy Information Administration. County-level data needed.*
- Percentage renewable energy consumption of total energy consumption. *State-level data available from U.S. Department of Energy – Energy Information Administration. County-level data needed.*
- Percentage of renewable energy generated in state. *State-level data available from U.S. Department of Energy – Energy Information Administration. County-level data needed.*
- Percentage of municipalities committed to purchase green energy. *Consensus on definition and data collection or survey work needed.*
- Number or percentage of energy efficient homes and businesses (new and retrofit). *Consensus on definition and data collection or survey work needed.*

Climate change

- GHG emissions by sector and county for current year. *State-level data available from U.S. Department of Energy – Energy Information Administration. County-level data needed.*
- Number of business or organizations participating in GHG trading programs. *Available from Chicago Climate Exchange.*
- Volume of carbon offset credits traded. *Available from Chicago Climate Exchange.*

Water

- Gallons of water used daily per capita, by sector, county or watershed. *Available from Southern Illinois University via data from U.S. Geological Survey.*

Waste

- Amount of municipal solid waste landfilled, recycled, composted, and reused. *State-level data available from U.S. Environmental Protection Agency. Regional data needed.*

Purchasing

- Percentage of municipalities committed to purchasing green products. *Consensus on definition and data collection or survey work needed.*
- Dollars of government spending on green products. *Consensus on definition and data collection or survey work needed.*
- Number of new green products piloted by government entities. *Consensus on definition and data collection or survey work needed.*
- Number of cradle to cradle anti-waste products purchased. *Consensus on definition and data collection or survey work needed.*

Brownfields

- Acres of infill and brownfield development. *Available from CMAP.*
- Value of investment in infill and brownfield development. *Data collection and survey work needed.*
- Acres of greenfield development. *Available from CMAP.*

Food & Hunger

- Percent of food consumed that was grown locally. *Consensus on definition and data collection or survey work needed.*
- Number of farmer's markets by municipality. *Available from U.S. Department of Agriculture and local sources.*

Transportation

- Average miles per gallon (MPG) for fleet. *Data and calculations needed. Vehicle MPG information available from U.S. Department of Energy and U.S. Environmental Protection Agency at www.FuelEconomy.gov.*
- Percentage of fleet using alternative fuels. *Data on number of alternative fuel vehicles in fleet available from Illinois Green Fleets. Additional data collection or survey work needed.*

Policies

- Percentage of municipalities employing innovations in green zoning and permitting. *Consensus on definition and data collection or survey work needed.*

Transit Oriented Development

- Percentage of population and jobs with access to transit. *Data available from Center for Neighborhood Technology.*
- Percentage of rail stations or bus corridors covered by an adopted TOD plan. *Data available from transit agencies.*

Air Quality

- Number of good air quality days per year by state sub-regions. *Available from the Illinois EPA.*

Goals, Objectives, and Strategies

This part of the report extracts key recommendations linked to challenges described earlier. Recommendations on who should lead the implementation of each goal has been left deliberately open in most cases. This is in part because dialog among a variety of stakeholders is needed to determine whether new organizations should be created or whether existing organizations could form new partnership programs. Much of this dialog could occur during the process of developing a regional sustainability plan (Goal #1). For example, a regional sustainability planning council could consider whether the region should establish a new energy organization such as Next Energy in Michigan (www.nextenergy.org), a non-profit organization established to enable commercialization of energy technologies, or Focus on Energy in Wisconsin (www.focusonenergy.com), an organization that works with business and residents to install energy efficiency and renewable energy projects as well as administer programs on behalf of utility and government clients. This decision could involve existing support centers for energy-related companies (entrepreneurship centers, manufacturing councils) as well as utility, foundation and government funders of incentive programs.

The decision on who should lead some goals may not require the same level of dialog. For example, lead sponsors of annual forums that focus on clean tech or green businesses (such as the Innovate! Forum or the Midwest Alternative Energy Venture Forum) would be obvious candidates for leading an effort to establish a Midwest clean tech venture capital fund. Similarly, leadership on developing new economic incentives for energy-related businesses in the region would also point quickly to state agencies, foundations or non-profit organizations that serve the region, such as the Illinois Department of Commerce and Economic Opportunity (DCEO), the Illinois Finance Authority, ComEd, Peoples Gas and the Illinois Clean Energy and Community Foundation.

CMAP has in place the organizational infrastructure for facilitating the development of a regional sustainability plan as well as filling in many of the information gaps, but would benefit from a partner (or partners) to fund a plan and provide expertise in sustainability issues.

Goal 1: Develop and Implement a Regional Sustainability Plan

Objective 1.1: Form a regional coordinating body to develop the plan.

Strategy 1.1.1: Consider models used by other regions (e.g. San Francisco, Los Angeles, Portland, Boston regions, etc.)

Strategy 1.1.2: Engage green leaders from a broad range of industry sectors.

Objective 1.2: Establish a baseline for tracking growth in the region's green economy.

Strategy 1.2.1: Develop a definition and standards for green establishments by industry sector, focusing first on emerging green industries and greening of key existing industries.

Emerging green industries include:

- **utility-scale power generation** from renewable sources (wind, solar and biomass)
- **manufacturing** - of renewable energy equipment components, green building products, recycled-content products, other green products (water treatment or air pollution control equipment, biobased chemicals, low toxicity, etc.)
- **construction** – installation and maintenance of renewable energy equipment (utility scale, commercial-scale and residential-scale equipment), biofuel production facilities, alternative fueling stations, green roofing and plumbing products, etc.
- **services** – engineering, energy efficiency, green building consulting and professional services
- **waste management** – material recovery services, wholesale distribution of reused or recycled materials
- **food** – local production, organic processing and food services. (This topic is the subject of a separate CMAP report.)

Key existing industries. The list of key industries could include:

- Industries with the highest existing employment levels
- Industries with above-average concentration in the region
- Industries with export potential and strong growth during the last growth cycle (2001-2006)

Strategy 1.2.2: Collect data on existing green business and jobs in emerging green sectors. A list of *potential* renewable energy equipment manufacturers in the 7-county region has already been obtained (see summary table in Appendix A). However, *actual* energy component manufacturing activity needs to be verified. Verification should ideally confirm what % of a business's products and services are green (% revenue from green products) as well as information relating to other green operations and manufacturing standards. Information on the greening of existing businesses and employment also needs to be identified or collected.

Strategy 1.2.3: Engage green business/development leaders and researchers as well as those in traditional business and economic development fields to come to a consensus on other indicators aside from number of businesses and jobs.

Strategy 1.2.4: Collect data to measure current status relating to these other green economic indicators.

Objective 1.3: Enact policies and practices that create demand for renewable energy production in the region.

Strategy 1.3.1: Develop new energy offices in the region. (See Goal 3 below.) A centralized energy office may be able to raise funds for short-term and longer-term needs for specific sectors, such as wind, solar, biomass, etc.

Strategy 1.3.2: Develop new financing resources and improve the business climate in the region for new renewable energy companies (see Goals 2 & 4, below).

Objective 1.4: Create demand for green energy and alternative energy.

Strategy 1.4.1: Encourage larger cities, businesses and institutions to make greenhouse gas reduction commitments similar to those in the Chicago Climate Action Plan. New federal targets in proposed climate change legislation (Waxman-Markey bill) should also be considered.

Strategy 1.4.2: Develop targets for greening fleets (to supplement federal requirements under EPACT).

Strategy 1.4.3: Develop appropriate climate change targets for smaller cities and establishments.

Strategy 1.4.4: Develop shared resources for developing implementation plans for different types of communities in the region in order to achieve significant results within the next ten years.

Objective 1.5: Enact policies and practices that create demand for green building products and services.

Strategy 1.5.1: Recommend targets for energy efficiency retrofitting of existing buildings for different types of communities (large older cities, smaller cities, newer suburbs, etc.). The targets established in the Chicago Climate Action Plan (retrofit of 50% of all existing residential and commercial buildings) may not be appropriate for suburbs with a larger stock of newer buildings or for smaller older cities that have less capacity and resources to administer energy efficiency or weatherization programs.

Strategy 1.5.2: Encourage adoption of ordinances requiring new public buildings (or major rehab of public buildings) to meet green building standards. Yorkville is an example of a smaller city that has adopted such an ordinance.

Strategy 1.5.3: Work with construction and building trade associations to create and publicize information on local businesses in the region that can provide green building products and services.

Objective 1.6: Enact policies and practices that create demand for waste reduction and resource conservation.

Strategy 1.6.1: Encourage recycling and reuse of commercial construction & demolition waste through ordinances such as Chicago's.

Strategy 1.6.2: Encourage recycling and reuse in residential construction & demolition projects.

Strategy 1.6.3: Encourage participation in the Chicago Waste-to-Profit Network and other material exchange or material recovery programs.

Strategy 1.6.4: Investigate opportunities for partnerships between waste recovery companies and university or corporate R&D experts to develop new products and markets for recovered materials.

Strategy 1.6.5: Investigate opportunities for partnerships with business schools to develop strategies for commercialization of new products.

Strategy 1.6.6: Work with recycling associations to create marketing tools for local businesses in the region that provide recycled-content products.

Strategy 1.6.7: Encourage all municipalities in the region to install water meters for all customers.

Objective 1.7: Assign responsibility for tracking progress in achieving and updating goals by industry and sub-region where possible.

Goal 2: Increase Capital Funding for Green Business

Objective 2.1: Support the creation of a new Midwest clean tech venture capital fund.

Strategy 2.1.1: Consider models from other regions (e.g., San Francisco, Boston)

Strategy 2.1.2: Convene or co-sponsor a series of dialogues with venture capital experts in the Chicago region, including foreign consulates and chambers. (Consider partnership with World Business Chicago?)

Strategy 2.1.3: Depending on the outcome of the regional dialogues, encourage the establishment and capitalization of a venture capital fund for green business expansion.

Objective 2.2: Support public loan guarantee programs.

Strategy 2.2.1: Develop information on existing federal and state loan guarantee programs (e.g., US Dept of Energy, SBA, IL Finance Authority).

Strategy 2.2.2: Disseminate information on public loan guarantee programs to local economic development professionals in the region.

Strategy 2.2.3: Encourage the development of new loan guarantees and financing programs, (e.g. by convening forums).

Objective 2.3: Develop other nontraditional financing programs.

Strategy 2.3.1: Research and develop a guidebook on nontraditional financing of renewable energy facilities, through sources such as Clean Renewable Energy Bonds (CREBs) or New Markets Tax Credits.

Strategy 2.3.2: Disseminate information on nontraditional financing opportunities to local economic development professionals in the region.

Goal 3: Create Networks and Support Centers

Objective 3.1: Identify gaps & overlaps in networks and support centers and how to fill/resolve/fund them.

Strategy 3.1.1: Convene a series of regional dialogues, both broad and sector-specific

Strategy 3.1.2: Coordinate between various institutions to ensure most effective arrangement of collaboration or competition.

Strategy 3.1.3: Raise the profile of the regional sustainability plan and the coordinating efforts to attract the attention of potential funders.

Objective 3.2: Develop new central energy office to support a network of targeted offices in the region to address common short-term and longer-term needs for specific renewable energy sectors as well as needs that cut across sectors.

Strategy 3.2.1: Identify common needs for specific renewable energy sectors (wind, solar, biomass, etc.). For example, it might support smaller wind farm developers by providing resources to conduct site-specific wind data studies.

Strategy 3.2.2: Identify needs that cut across renewable energy sectors. For example, it could monitor how much wind power is being purchased from in-state sources and consider the need for potential legislation to support other in-state sources rather than out-of-state wind.

Goal 4: Create New or Improve Existing Incentives, Policies, Regulations, and Standards

Objective 4.1: Develop up-to-date knowledge of incentives for green or greening industries. Include federal, state, local and private/market-based incentives and analysis of their availability, how they compare to incentives offered by competing states and regions, and what else is needed.

Objective 4.2: Develop new information on how local government can support sustainability through public policies, financial investment and purchasing decisions

Strategy 4.2.1: Research options for socially responsible investment of reserve funds (e.g., through investment of 1-2% in community-based investment funds)

Strategy 4.2.2: Research purchasing preference programs for green business and assess feasibility of developing a new GBE certification for green business (similar to MBE/WBE)

Strategy 4.2.3: Encourage participation in regional green purchasing groups that support green and local businesses.

Strategy 4.2.4: Encourage public purchasing officers to green their specifications for buildings, energy, fleets and supplies.

Objective 4.3: Identify policy/regulatory barriers and recommend changes that foster green economic development.

Strategy 4.3.1: Public sector energy policy – purchase of renewable energy and carbon offsets

Strategy 4.3.2: Green and local purchasing – preference for green products and “Green Business Enterprises” that meet standards established for specific industries.

Strategy 4.3.3: Zoning and building code updates – to establish standards for new types of green businesses and green building products and equipment.

Strategy 4.3.4: Recycling/reuse – greening of contracts relating to public services, demolition activities and special events.

Objective 4.4: Improve industry standards and certifications contractors and for trained workers and safe work practices for emerging green industries that currently lack clear standards. (Example: lack of clear standards for deconstruction workers.)

Goal 5: Provide Education, Information, and Training

Objective 5.1: Educate the business and economic development communities about the economic implications and opportunities of a resource constrained economy, with emphasis on carbon and water resources.

Strategy 5.1.1: Hold sector-specific workshops (e.g. weatherization) as well as inter-sector workshops (e.g. Chicago Wilderness/CMAP transportation & environment) to improve understanding of both industry specifics and interconnections.

Strategy 5.1.2: Develop training programs on the economic impact of climate change and resource constraints and new revenue opportunities through carbon trading.

Objective 5.2: Expand education to business and economic development communities about economic incentives for emerging green business and greening of existing businesses.

Strategy 5.2.2: Explore partnership opportunities for training.

Strategy 5.2.3: Identify new funding opportunities for training.

Conclusions

The transformation to a greener economy is gaining momentum across the country and there is no doubt it will be a part of the Chicago region's growth over the next 30 years. Whole new economic systems are emerging that will add value to some green industries based on carbon impacts. New systems to protect scarce water resources may also emerge over the next 30 years along with breakthroughs in solar, biofuel or biomass technologies. Understanding these new systems and finding resources for staying current are key themes.

A virtual library of national green job outlook reports have been released since the fall of 2008. Each of them assumes that federal climate change regulation or energy investments will result in significant increases in the purchase of renewable energy (electricity and transportation fuels) and significant decreases in the consumption of energy and water.

The challenge is that federal regulations and stimulus funding – although important springboards – are a fraction of the investment that will have to be sustained nationwide over the next 30 years. Federal spending will need to spur widespread adoption of policies and programs that support renewable energy production and energy efficiency retrofits on a massive scale over the next decade and beyond.

Five key goals or recommendations for accomplishing this over the next 30 years include: the adoption of a regional sustainability plan, new capital funding for clean tech, new support networks, an improved business climate for green business and education on paradigm shifting changes.

This report is a snapshot in time on what we know today about rapidly emerging green energy, building and waste reduction sectors, along with a description of policies and incentives that are driving growth in these sectors and about what is needed for existing industrial sectors to remain viable in a rapidly changing business environment. Review and evaluation of needs for each sector and new ones that will undoubtedly emerge will be needed for the economic success of these sectors over the next 30 years.

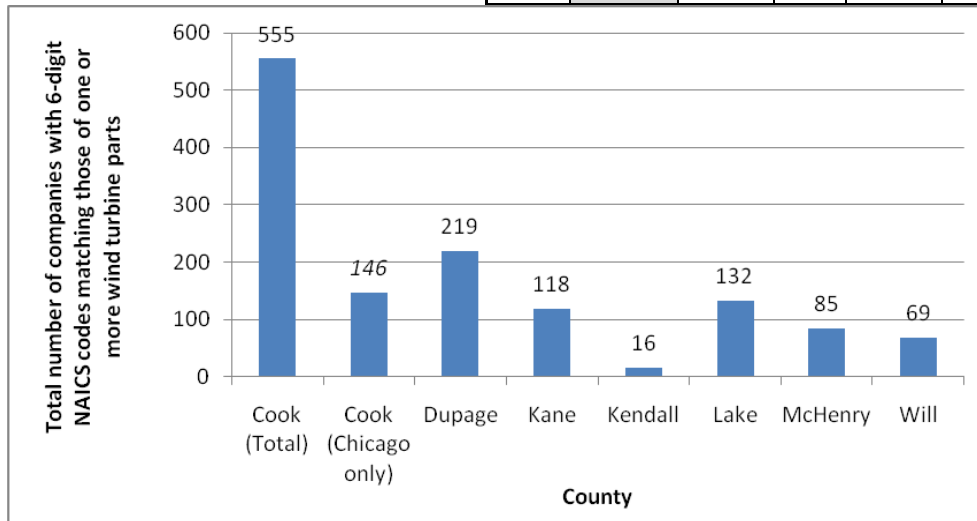
Appendices

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APPENDIX A: Total number of companies in 7-county region with 6-digit NAICS codes matching those of one or more renewable energy components. Compiled by the Delta Redevelopment Institute. *Source: Renewable Energy Policy Project, using data from Dun and Bradstreet, 2007.*

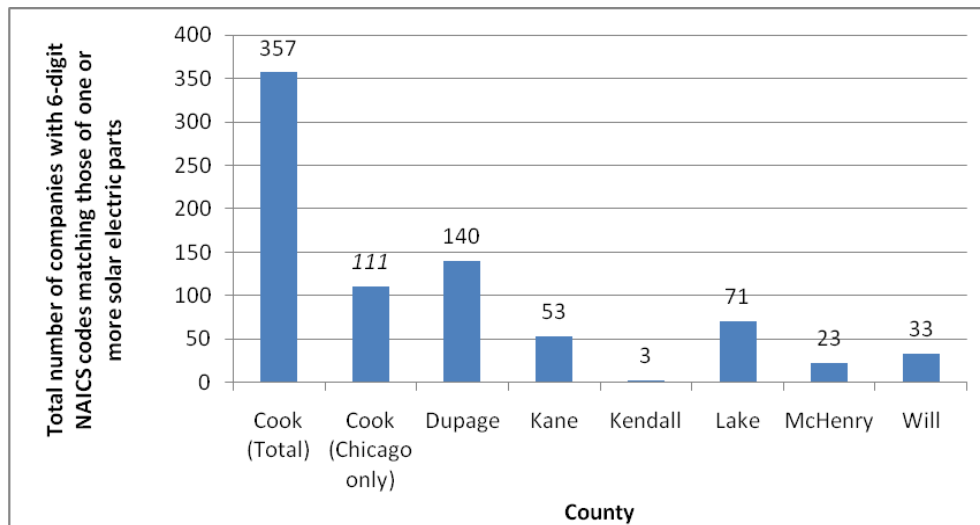
WIND:

Part(s)	NAICS		# of Companies by County								
	Industry Code	Industry Description	Cook (Total)	Cook (Chicago only)	Dupage	Kane	Kendall	Lake	McHenry	Will	7-County TOTAL
Bearings	332991	Ball and Roller Bearings	7	1	2	7		2			18
Blade Extender; Hub; Nacelle Frame; Tower Flanges and Bolts	331511	Iron Foundries	8	5	4	1	1		4	1	19
Brakes; Coupling; Shafts	333613	Power Transmission Equip.	8	2	5	1		2		1	17
Cooling System	333412	Industrial and Commercial fans and blowers	1								1
Electronic Controller	334418	Printed circuits and electronics assemblies	37	4	26	5		7	6		81
Gear Box	333612	Speed Changer, Industrial	8	5	4	2		1		2	17
Nacelle Case; Rotor Blade	326199	All Other Plastics Product Manufacturing	247	65	103	71	13	72	57	32	595
Pitch Drive; Yaw Drive	335312	Motors and Generators	21	5	13	4		10	4	2	54
Power Electronics	335999	Electronic Equipment and Components, NEC	62	19	20	14		12	4	4	116
Sensors and Data Loggers	334519	Measuring and Controlling Devices	54	7	13	2		9	4	1	83
Towers	332312	Fabricated Structural Metal	102	33	29	11	2	17	6	26	193
TOTAL			555	146	219	118	16	132	85	69	1194



SOLAR ELECTRIC:

Part(s)	NAICS		# of Companies by County								
	Industry Code	Industry Description	Cook (Total)	Cook (Chicago only)	Dupage	Kane	Kendall	Lake	McHenry	Will	7-County TOTAL
Complete Module, Solar Cells, Blocking Diode	334413	Semiconductors and Related Devices	22	5	9	7		5	2	1	46
Top Surface	327211	Flat Glass	17	9		2		1	1		21
Encapsulant	325211	Plastics Material and Resin Manufacturing	24	6	7	8		3	4	6	52
Rear Layer	326113	Unlaminated Plastics Film and Sheer (Except Packaging) Manufacturing	25	10	8	6	1	11	1	2	54
Frame	332322	Sheet Metal Work Manufacturing	118	40	63	10	1	13	8	9	222
Charge Controller, Inverter	335999	Electronic Equipment and Components, NEC	62	19	20	14		12	4	4	116
Circuit Breakers and Fuses	335313	Switchgear and Switchboard Apparatus Manufacturing	22	7	9	3		5	1	4	44
Meter	334515	Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals	39	11	14	3		8	1	1	66
Switch Gear, Electrical Connections	335931	Current-Carrying Wiring Device Manufacturing	26	4	8		1	13	1	6	55
Wiring	331422	Copper Wire (except Mechanical) Drawing	2		2						4
TOTAL			357	111	140	53	3	71	23	33	680




Appendix B: Chicago Climate Action Plan Strategies and Actions

Chicago Climate Action Plan Strategies and Actions	
Strategy	Actions
Energy Efficient Buildings	<ol style="list-style-type: none"> 1. Retrofit commercial and industrial buildings: Retrofit 50 percent of commercial and industrial building stock, resulting in a 30 percent energy reduction = 1.3 MMTCO₂e reduction* 2. Retrofit residential buildings: Improve efficiency of 50 percent of residential buildings to achieve a 30 percent reduction in energy used = 1.44 MMTCO₂e reduction* 3. Trade in appliances: Expand appliance trade-in and lightbulb replacement programs = .28 MMTCO₂e reduction* 4. Conserve water: Improve water use efficiency in buildings as part of retrofits = .04 MMTCO₂e reduction* 5. Update city energy code: Align Chicago's Energy Conservation Code with the latest international standards = 1.13 MMTCO₂e reduction* 6. Establish new guidelines for renovations: Require all building renovations to meet green standards = .31 MMTCO₂e reduction* 7. Cool with trees and green roofs: Increase rooftop gardens to a total of 6,000 buildings citywide and plant an estimated 1 million trees = .17 MMTCO₂e reduction* 8. Take easy steps: Encourage all Chicagoans to take easy steps to reduce their emissions by one metric ton of CO₂e per person = .8 MMTCO₂e reduction*
Clean and Renewable Energy Resources	<ol style="list-style-type: none"> 1. Upgrade power plants: Upgrade or repower 21 Illinois power plants = 2.5 MMTCO₂e reduction* 2. Improve power plant efficiency: Raise efficiency standards for new and existing power generators = 1.04 MMTCO₂e reduction* 3. Build renewable electricity: Procure enough renewable energy generation for Chicagoans to reduce electricity emissions by 20 percent = 3.0 MMTCO₂e reduction* 4. Increase distributed generation: Increase efficient power generated onsite using distributed generation and combined heat and power = 1.12 MMTCO₂e reduction* 5. Promote household renewable power: Double current household-scale renewable electricity generation = .28 MMTCO₂e reduction*
Improved Transportation Options	<ol style="list-style-type: none"> 1. Invest more in transit: Invest in transit improvements and boost Chicago's transit system ridership by 30 percent = .83 MMTCO₂e reduction* 2. Expand transit incentives: Provide incentives for transit use, such as pre-tax transit passes = .03 MMTCO₂e reduction* 3. Promote transit-oriented development: Encourage development focused on public transit, walking and bicycle use = .63 MMTCO₂e reduction* 4. Make walking and bicycling easier: Increase the number of walking and biking trips to one million a year = .01 MMTCO₂e reduction* 5. Car share and carpool: Boost car sharing, carpooling and vanpooling = .5 MMTCO₂e reduction* 6. Improve fleet efficiency: Improve the energy efficiency of fleets in Chicago, including buses, taxis and delivery vehicles = .21 MMTCO₂e reduction* 7. Achieve higher fuel efficiency standards: Advocate for the implementation of higher federal fuel efficiency standards = .51 MMTCO₂ reduction* 8. Switch to cleaner fuels: Increase the supply and use of sustainable alternative fuels to Chicago vehicles = .68 MMTCO₂e reduction* 9. Support intercity rail: Support intercity high-speed passenger rail plan 10. Improve freight movement: Faster, more efficient freight movement, including support for CREATE = 1.61 MMTCO₂e reduction*
Reduced Waste and	<ol style="list-style-type: none"> 1. Reduce, reuse or recycle: Reduce, reuse and recycle 90 percent of the city's waste by 2020 = .84 MMTCO₂e reduction* 2. Shift to alternative refrigerants: Promote use of alternative refrigerants in air

Industrial Pollution	<p>conditioners and appliances = 1.16 MMTCO₂e reduction*</p> <p>3. Capture stormwater on site: Manage stormwater with green infrastructure = .1 MMTCO₂e reduction*</p>
Adaptation	<ol style="list-style-type: none"> 1. Manage heat: Update the heat response plan, focusing on vulnerable populations, complete further research into urban heat island effect and pursue ways to cool hot spots 2. Pursue innovative cooling: Launch an effort to seek out innovative ideas for cooling the city and encourage property owners to make green landscape and energy efficiency improvements. 3. Protect air quality: Intensity efforts to reduce ozone-precursors through mitigation programs that reduce driving and emissions from power plants. 4. Manage stormwater: Collaborate with the Metropolitan Water Reclamation District on a Chicago Watershed Plan that factors in climate changes and uses vacant land to manage stormwater. 5. Implement Green Urban Design: Implement key steps in Chicago's Green Urban Design plan to manage heat and flooding. These steps will enable Chicago to capture rain where it falls and reflect away some of the intensity of the sun on hot days. 6. Preserve our plants and trees: Publish a new plant-growing list that focuses on plants that can thrive in altered climates. Also draft a new landscape ordinance to accommodate plants that can tolerate the altered climate. 7. Engage the public: Share climate research findings with groups most affected – social service agencies, garden clubs, etc. Help individual households to take their own steps to reduce flooding and manage heat waves, such as installing rain barrels and back-up power for sump pumps and planting shade trees. 8. Engage businesses: Work with businesses to analyze their vulnerability to climate change and take action. 9. Plan for the future: Use the Green Steering Committee of City Commissioners to oversee City implementation efforts and the Green Ribbon Committee of business and community leaders to assess how the plan is being implemented, recommend revisions, and report to the Mayor and all Chicagoans on our progress.

Source: Chicago Climate Action Plan, www.chicagoclimataction.org (accessed 14 May 2009).

Appendix C: Case studies focused on job creation potential and investment impact.*CASE STUDIES OF EMERGING GREEN BUSINESSES:***Green Energy Case Studies**

1. **Wind component manufacturing: A. Finkl & Sons.** 130 year old steel producer and open-die forge located close to downtown Chicago, transitioned over lifetime from brick chipping hammers to 200,000-lb forgings. Current production includes products for power transmission and wind energy. Major expansion is underway for a new facility on Chicago's South Side, targeting a 200% increase in annual output.
2. **Solar component manufacturing: Allied Tube & Conduit.** As steel becomes an increasingly popular material for custom built mounting structures for commercial and industrial scale photovoltaic array fields, Allied Tube & Conduit has identified solar as the number one growth market of the 70 markets the company serves. Headquartered in Harvey, IL, Allied Tube & Conduit is the largest business unit of the well-known Tyco Electrical and Metal Products division of Tyco International.
3. **Geothermal: Indie Energy.** Evanston-based company that develops geothermal-based, renewable-energy systems for commercial and public buildings, planned unit developments, and single-family homes. Indie's turnkey geothermal systems produce \$4 of renewable energy for every \$1 spent on electricity. Efficient systems result in lower maintenance costs and typical payback is 5-6 years. In December 2008 Indie Energy and Local 150 of the International Union of Operating Engineers, AFL-CIO entered into labor agreement for construction of local geothermal energy fields for heating and cooling Chicago-area buildings.
4. **Solar energy system development: SoCore Energy LLC** (www.socoreenergy.com) is a Chicago-based solar energy system developer that finances and installs portable rooftop photovoltaic facilities for municipal and commercial building owners. Customers purchase electricity generated from these systems through a fixed-rate contract called a Power Purchase Agreement. SoCore's employment increased from 2 to 11 employees in 2008 and it anticipates adding 4-5 more in 2009. Subcontracting installation work will add another 50-75 jobs across the U.S. Manufacturing of SoCore's unique systems takes place in Tennessee.
 
 - Challenges: Energy produced by SoCore's systems is more expensive than energy provided through the grid by coal and nuclear plants.
 - Demand drivers: Government policies and incentives have boosted demand for SoCore's systems in other states. New Jersey's solar Renewable Portfolio Standard and Massachusetts' rebate programs help level the playing field and create demand for SoCore's services. SoCore has proposed legislation similar to New Jersey's for Illinois but has not yet found a sponsor. SoCore is proposing a solar PV carve-out within the total RPS, starting at 0.01% in 2009 and increasing to 5% by 2025. Utilities that fail to meet the RPS goal would be required to pay a noncompliance penalty or to purchase solar Renewable Energy Credits (RECs). These penalties

or Solar RECs have been instrumental in subsidizing the cost of solar energy installations in New Jersey.

New stimulus money (through the City of Chicago) could also help offset the cost of solar installations on the rooftops of municipal buildings in Chicago.

- **Biomass production: Robbins Community Power LLC** (www.rcpower.us – website under construction) is in the process of recommissioning and reopening a former waste-to-energy electric plant as a renewable energy biomass plant with a 50 megawatt turbine. The plant is located in the economically-disadvantaged south suburb of Robbins and would sell power wholesale to the grid. RCP was formed in 2006 and is still working through development issues relating to recommissioning and reopening. RCP's job creation potential depends on feedstock, which may include clean wood waste or other cellulosic material. The plant would also contribute increased property taxes to Cook County and the Village once the existing TIF district expires in 2017. Perhaps the most important economic impact of the new plant will be as a major buyer of wood waste and other cellulosic waste material in the region.
 - **Challenges:** Approximately \$55 million in capital financing is needed to reopen the plant. Although Citibank owned the debt on the former plant and is a partner in the new venture, it is no longer able to extend financing to the project. RCP is in the process of raising private capital, in part through New Markets Tax Credits (NMTC).
 - **Demand drivers:** RCP is confident it can sell as much energy as it can produce. Demand for biomass energy is being driven by general increased demand for electricity as well as Illinois' Renewable Energy Portfolio Standard.
 - **Opportunities:** Plants like RCPs present a potential economic opportunity for smaller wood and landscaping waste producers to pool their waste into a form for sale to RCP. It also may be possible for RCP to sell energy directly to nearby municipalities or businesses in the south suburbs at a reduced retail price in the future. The current plan is to sell only to the grid at wholesale price.
- 5. Case study: urban and municipal challenges, and potential solution through off-site aggregate net metering.** Urban space constraints often make it difficult for organizations to generate renewable energy onsite, particularly through wind turbines. Illinois House Bill 6660 (not yet approved at the time of publication, with major opposition from the electric utility companies) would allow units of local government that own or operate renewable electric power generation facilities, including wind turbines, to use "meter aggregation," a subset of net metering that allows meters to be grouped together for reading and billing purposes. Electrical energy generated at the wind turbine site meter is credited on a 1:1 kilowatt-hour basis against usage at the aggregated meters, which may be off-site meters. Because local government agencies are ineligible for the tax advantages enjoyed by private businesses for installing wind turbines, meter aggregation is an effective means for governmental wind turbine farms to be cost effective. Moreover, with a consortium and with meter aggregation, the wind turbine farm can be located in rural areas that have greater wind potential.

Green Building Case studies

1. **Testa Produce, Inc.** – first LEED Platinum industrial building is proposed on 12 acre site in the Stockyards Planned Manufacturing District. According to the development consultant for the project (Wendy Berger Shapiro of WBS Equities, LLC), Peter Testa’s personal commitment to doing the right thing for the world was the key driver behind the efforts to build green. Key features include: a 750 KW wind turbine, solar hot water heating system, solar trees (free-standing pole mounted solar panels), bioswales to retain close to 100 % of stormwater, permeable pavers, daylighting, LED lighting, blackwater and graywater recovery system, and a green roof covering more than 50% of the roof. Challenges: zoning issues (free standing wind turbines and free standing solar systems are not currently permitted under Chicago’s current zoning code), understanding payback periods on multiple green technology improvements, and understanding incentives. Testa Produce did not have trouble finding local suppliers except for some specialized equipment (like the 750 KW wind turbine); once word got out about the project, suppliers and contractors found them.
2. **Leopardo Construction.** Chicago-based construction firm, 30 years old, recognized leader in green building practices with extensive project experience in LEED construction. Active role in both local and national levels of U.S. Green Building Council. Demand drivers: market uptake particularly in Chicago region, green building incentives, quantification of cost savings.
3. **SoCore Energy, LLC** – new Chicago company builds and maintains rooftop solar electricity systems for commercial and institutional buildings. Please refer to case study in the “Existing Facilities & Case Studies” section of the Green Energy chapter.
4. **Solar Tracking Skylights** (www.solar-track.com) Solar-Tracking Skylights is a Chicago-based skylight product manufacturer. Since it was established in 2005, employment in the Chicago office has increased significantly and sales have increased over 500% per year over the last 3 years. Indirect employment growth has also resulted from manufacturing contracted to a firm in California and installation on buildings wherever the product is sold. STS’s skylights are uniquely designed with rotating reflective panels to capture daylight even in less than ideal conditions. The target market for the company is large corporations with multiple big box locations. Demand for energy-saving green building products is higher in states and countries with relatively high electricity costs (e.g, New England states plus NY, NJ and CA as well as many European countries).
 - **Demand:** Market demand for LEED-certified buildings and high electricity costs are key drivers of demand for energy saving building products.
 - **Challenges:** Relatively cheap electricity (based primarily on fossil fuel sources), relatively weak incentives in many states for energy saving improvements for commercial and industrial building owners. Roof warranty considerations also affect building retrofit decisions.
 - **Incentives:** Grants such as a matching grant from the Illinois Clean Energy & Community Foundation have funded pilot projects such as installation of STS skylights in a CTA bus barn.

New federal stimulus funding (especially \$6.3 billion in new federal grants to cities, counties and states to improve energy efficiency) is likely to boost demand for energy saving building products. States that mandate utility subsidies have significantly increased acceptance of the product.

CASE STUDIES OF GREENING EXISTING ORGANIZATIONS:

1. **University: University of Illinois at Chicago (UIC) - Office of Sustainability:**

<http://www.uic.edu/sustainability/>. UIC has embraced the green revolution in a big way in the past two years. In 2007, UIC became one of roughly 350 charter signatories to the American College & University Presidents Climate Commitment. A year later, UIC participated in the pilot phase of a new national sustainability rating system for colleges and universities known as “STARS” (Sustainability Tracking, Assessment & Rating System). Shortly after this, the Office of Sustainability was created by former Chancellor Sylvia Manning to oversee and implement all the Campus Climate Commitments and other sustainability programs including an additional commitment to a state pledge, the Illinois Sustainable University Compact, in cooperation with the Illinois Green Government Coordinating Council, then chaired by former Lieutenant Governor Pat Quinn. In addition to LEED certification and transportation actions, the state pledge requires UIC to join EPA’s ENERGY STAR challenge to increase energy efficiency on campus, to explore membership in a carbon reduction and trading system, increase waste recycling and buy non-toxic cleaning products, and to accomplish these goals by December 31, 2010. The Office of Sustainability also coordinates existing ongoing efforts by various administrative departments relating to recycling, development of a new green cleaning pilot program, enrollment in a green purchasing consortium being organized by the Delta Institute and requiring LEED silver certification for capital building projects exceeding \$5 million.

2. **Sustainable Cities and School Districts.** The City of Chicago is a leader in the region in adopting an ambitious Chicago Climate Action Plan (CCAP). This plan is discussed as one of the policies driving growth in building retrofits in particular. Smaller cities and school districts in the region are demonstrating how local government and local school districts can lead by example in greening their operations and investing in new green buildings and fleets.

a. Aurora, IL. Mayor Tom Weisner has signed an executive order establishing a city sustainability advisory committee, or a ‘Green Team’ to ensure cross-departmental participation in the creation of environmentally sustainable initiatives. http://www.aurora-il.org/publicproperties/equipment_services/ <http://www.aurora-il.org/neighborhoodstandards/sanitation/recycling.php>

b. Chicago Public Schools - Environmental Action Plan. With over 600 school buildings in its system and responsibility for thousands of school buses, it is a major user of energy, office and janitorial supplies and, indirectly, diesel fuel. Schools with hot lunch programs are also major generators of food waste. In July 2008, the CPS Environmental Action Plan was developed by environmental leaders within CPS and endorsed by its Senior Leadership

Team. Key Departments are now implementing these strategies, which include a new “Paper Busters” competition. Schools compete for prizes by reducing paper use, buying recycled-content paper and encouraging recycling of waste paper. CPS’s Environmental Program Manager oversees the implementation of the action plan. More information on the status of these implementation projects as well as other green tips for schools can be found at:

<http://cps.k12.il.us/programs/PaperWasteBusters/CPSEnvironmentalActionPlan.pdf> and
http://cis.uchicago.edu/outreach/workshops/08-09/documents/080926+081024_CPS_Green_School_Tips.pdf

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About the Delta Redevelopment Institute

The Delta Institute and Delta Redevelopment Institute are affiliated non-profit organizations formed in 1998 that work for a cleaner environment, healthier communities and a greener economy in the Great Lakes region. The Delta Redevelopment Institute was formed as a supporting 501(c)(3) organization to the Delta Institute focusing on brownfield and other economic development initiatives.

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