

*Meeting the Challenge:  
Opportunities  
for Midwest Action  
on Climate Change*

**Midwest Climate Change Project**  
*Part 1.*



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## Executive Summary

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**G**lobal warming is happening, but action now can prevent temperatures from rising to levels that will have catastrophic consequences. While reducing greenhouse gases has costs, the cost of not acting is far greater.

Local actions are the starting point for a problem that must be addressed worldwide. The American Midwest is the source of almost 5% of the world's greenhouse gas (GHG) emissions. While its governments, corporations, and civil society groups have taken some action, the Midwest lags far behind the coasts in coordinated programs and policies to reduce GHG emissions. In the absence of federal action, states and cities must take – and are taking – the lead.

A strong regional voice united around a set of climate and energy policies will be the most effective action of all. Momentum for this increased in December 2005, when a group of business, civil society, government, and union representatives from across the Midwest met to consider what a regional approach to climate change might look like and to identify areas of greatest convergence. This report grew out of that meeting.

What has become clear in writing this report is that the Midwest is the missing link in the national discussion on climate change. The Northeast and the West Coast have already taken the lead. The addition of organized, coherent Midwestern action that complements the coastal initiatives could tip the balance toward meaningful national action.

The potential for significant change is greater now than ever before. The public is more aware of the consequences of inaction and beginning to realize that many of the actions proposed to reduce GHGs would also reduce the nation's dependence on foreign oil. Corporations recognize that legislation will be passed to provide incentives for GHG reduction and to regulate emissions. Frustrated by states that impose different requirements, business leaders welcome steps that lead to greater alignment. State and local governments have begun to act, and the 2007 legislative sessions are likely to lead to more action. Civil society groups are increasingly working with other stakeholders as they define their agenda. The time seems right for coordinated action.

However, it is clear that not all Midwest actors are aware of what others are doing – hence this report. Part 1, *Opportunities for Midwest Action*, highlights areas where there is the greatest convergence of support for actions. Part 2, which is printed separately, is an inventory of many of the actors in the Midwest and summaries of their key activities.

Ten major themes emerged as a result of our research:

- 1) Developing **a common analytic framework and scorecard** for measuring progress will help the climate change discussion. Increasingly there is agreement that Stephen Pacala and Robert Socolow's concept of "wedges" is a useful framework to establish a common language and measure success.
- 2) Midwestern stakeholders want **one set of standards for greenhouse gas emissions**. To the extent that corporations, states, and civil society groups can come together on

common standards, the Midwest will be in a stronger position to influence the federal government when it considers adopting a cap and trade system. Standards need to be high enough that they will indeed lead to meaningful reduction of GHGs. The time is ripe for a discussion about standards from a Midwest perspective, convened by a well-respected outside group.

- 3) **Tracking GHGs** across the Midwest is an important next step, as the results would promote greater awareness of emissions and set a base for reductions. The voluntary Multi-State Climate Registry, now being crafted by Midwest states with input from corporations and civil society groups, will go a long way toward accomplishing these goals. The Registry will use standards consistent with those of the Northeast Regional Greenhouse Gas Initiative (RGGI) and California standards.
- 4) Momentum to establish state-level **emissions reduction targets** is building in the Midwest and across the nation. Supporters of federal standards continue to multiply. The Midwest could become the home of a powerful lobby for federal regulation of CO<sub>2</sub>.
- 5) **Renewable energy and fuels** are seen as the pathway to economic development and greater energy independence in every Midwest state, and states that have not established renewable portfolio and fuel standards will soon do so. These standards, as well as new incentives, will accelerate the development of wind, solar, and biomass energy. The interest of states in reducing oil dependence coincides with the interest of corporations and investors in developing new sources of energy.
- 6) The outlook for **reducing auto emissions and improving fuel economy** is less positive, at least at this writing. Technologies to reduce auto emissions are available, but Midwest automobile companies have yet to deploy them. A few Midwestern states are nonetheless beginning to explore the adoption of California emission standards for cars.
- 7) The commitment to **energy efficiency** is only slowly growing, pushed in part by high oil prices. With opposition diminishing, various government incentives and regulations will be proposed in the next year. A number of actions are possible, from appliance design to building codes to incentives that minimize sprawl, but surprisingly little has been done despite low costs and the potential for significant savings.
- 8) Nearly all stakeholders recognize the value of proving and commercializing **clean coal** technology, though they do not reach consensus in stopping construction of new plants that will lock the region into high GHG emissions. Seventy percent of the Midwest's electricity is produced from coal and more than two dozen new Midwest coal-fired electric plants are planned. While there is agreement that current technologies are harmful, the level of commitment to using new technologies varies. Some coal companies are committed to using integrated gasification combined cycle (IGCC) technology, while others intend to depend on current technology – an intention adamantly opposed by civil society groups, some investors, and even some states. IGCC plants save GHG emissions only if the carbon released during manufacturing is sequestered. Research on carbon sequestration technologies is a priority.

- 9) Farmers are finding that **managing farmland to sequester carbon** can produce significant profit. Developing a system that encourages such sequestration should be possible and will face minimal opposition. The key is to find a means to verify the emission reductions.
- 10) A greater investment in **public education** is essential. Although they are more aware of global warming and its consequences, Midwesterners can do more to advocate for the policies necessary to reduce GHGs and to take individual actions.

In short, opportunities for progress exist in good number and stakeholders are increasingly in agreement about what needs to be done. Several key questions remain. As the actions described here are implemented, will they be sufficient to meet a Midwest goal of stabilizing GHG emissions or better? Can we establish mechanisms that will ensure accurate reporting and accountability? Can public interest be focused and deepened to ensure that we invest in our children's future? Will Midwest public leaders be willing to spend what it takes to address climate change now, to avoid imposing much higher costs on future generations? By identifying the areas of agreement, this report hopes to encourage stakeholders to move forward with greater certainty and speed.





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## Introduction

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“We have ten years left to get on a track” to address world climate change, concluded Rosina Bierbaum, Dean of Natural Resources at University of Michigan, at a 2006 Wingspread Center meeting of the National Leadership Summit for a Sustainable America. She referred to comments by Jim Hansen, NASA’s chief climate scientist, who has said, “We are getting close to a tipping point...” Several degrees of temperature rise are unavoidable. The changes will be substantial, but something to which we can probably adapt. However, if we stay on a business-as-usual path for another decade, the impacts will be dire.<sup>1</sup>

Scientific evidence suggests that it is critical to prevent global average temperatures from rising more than 2°C (3.6°F) above pre-industrial levels to avoid the worst effects of global warming. This requires a gradual reduction in greenhouse gas emissions to about 80% below 1990 levels by 2050.<sup>2</sup> To meet this target, the primary stakeholders – government, business, and nongovernmental organizations – must begin to align for change now.

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<sup>1</sup> *A Science Adviser Unmuzzled, Q&A: “NASA’s Chief Climate Scientist, Who Charged That His Views on Global Warming Were Being Squelched, Says We’re Getting Close to the Tipping Point,” Time Web Exclusive, Science, March 24, 2006.*

<sup>2</sup> *The 80% goal is consistent with the emission reduction targets announced by British Prime Minister Tony Blair, California Gov. Arnold Schwarzenegger, New Mexico Gov. Bill Richardson, and six New England states. Union of Concerned Scientists, Global Warming Climate Policy Update, July 2006.*



Challenging as it will be to achieve, quick action makes good sense both environmentally and economically. According to a report issued by Sir Nicholas Stern, head of the British Government Economics Service and Adviser to the Government on the Economics of Climate Change and Development, the benefits of strong, early action on climate change far outweigh the costs.<sup>3</sup> The report estimates the annual costs of stabilization at 500-550 ppm of CO<sub>2</sub> (the level required to stabilize current growth in emissions) as equivalent to 1% of global gross domestic product by 2050. The cost of not acting, however, will be as much as five times greater, and this does not take into account the benefits from reducing the nation's dependence on foreign oil.

### ***The Role of the Midwest***

Almost five percent of the world's GHG emissions originate in the American Midwest<sup>4</sup>, a significant contribution to the global warming problem.

The response to the current crisis must be global, and the Midwest must and can make a significant contribution to GHG reductions. Steps to mitigate climate change would contribute to warding off the regional consequences of higher temperatures – falling Great Lakes levels, more violent storms, hotter summers – and simultaneously enhance the regional economy. The Midwest is a leading manufacturer of engines, cars, trucks, buses, farm equipment, controls, and appliances and is also a key source of coal, biofuels, wind energy, and agricultural and wood products. In each of those industries, “green” market opportunities abound. Uniting now behind a broad agenda would ensure a share of those new markets and provide a Midwest voice in the national debate on addressing climate change.

A marked increase in awareness of climate change and energy security occurred in 2006, a byproduct of high fuel prices and media attention, due in part to the film *An Inconvenient Truth*. In response, and foreseeing potential “green” revenues, elected officials throughout the Midwest began developing energy plans, encouraging efforts to develop renewable energy, and committing to measurable emissions reductions. Corporations are inventorying their GHG emissions and implementing plans to lower them. Many are calling for federal caps on emissions.

Environmental organizations are working with companies to design reduction strategies and with legislators to design new policies. Leaders of the new U.S. Congress have plans for action on climate change and renewable energy that will benefit the Midwest. Environmental groups such as Fresh Energy, the Michigan Environmental Council, and the Environmental Law and Policy Center of the Midwest (ELPC) are partnering with companies such as BP, Baxter, NiSource, and Exelon to find common ground that will lead to mutually beneficial energy policies. In addition, investors are pouring billions into new energy technologies that should bring more renewable energy on line in the next decade.

Yet this is nowhere near enough to reduce global warming emissions to the targeted goal of 80% below 1990 levels by 2050, the level needed to avoid catastrophic impacts. While some regions, notably the West Coast and the Northeast, have taken aggressive collaborative action on climate change, this has not happened in the Midwest, where a regional scorecard for progress in reducing emissions, a basic benchmarking tool, does not exist.

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<sup>3</sup> *Stern Review*, The Economics of Climate Change, October 2006.

<sup>4</sup> Loosely defined as Illinois, Indiana, Iowa, Michigan, Ohio, and Wisconsin.

### ***Identifying Opportunities***

The purpose of the Global Philanthropy Partnership's Midwest Climate Change Project is to clarify the near- and mid-term opportunities to accelerate Midwest climate action. In this report, we have identified the stakeholders who support and resist the approaches. Each section is organized to identify activities that have the greatest amount of support among all stakeholders and are the easiest to implement. The report describes not only what is happening in the Midwest but also how these efforts could be strengthened within the next decade. We believe that agreement about Midwest priorities and opportunities can inform the development of legislation at the federal level and enhance the chances of enacting such legislation.

The findings were drawn from a companion report, Part 2, *Midwest Climate Change Leadership Inventory*, a summary of government, business, and civil society projects attempting to address climate change and energy transformation. Many actors profiled in the inventory are working toward similar goals, which suggests that working together across state lines and stakeholder groups could build a critical mass for change. The broad opportunities are summarized on the next page. The body of the report describes each of these opportunities: what is being done, what more could be done, and the leaders who can tip the balance. The report, written by two Chicagoans, is over-weighted with Illinois and Chicago examples. However, a strong effort was made to capture the full range of Midwest opportunities.

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# Summary of Midwest Opportunities

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## **Document the Extent of the Climate Challenge in Clear and Precise Terms**

- Complete the Midwest Socolow Wedge Analysis
- Update analysis of Midwest climate impacts

## **Adopt Standards of Accounting for GHG Emissions Reductions and Offsets**

- Encourage Midwest states to join the Multi-State Climate Registry
- Agree on accounting for reductions and offsets across states and trading systems
- Give the public better tools to guide action

## **Commit to Emission Reductions**

- Secure state commitments to limiting GHG emissions
- Engage more mayors to commit to reduce emissions
- Organize Midwest support for federal cap and trade
- Demonstrate the costs of climate change by legislative district

## **Establish Renewable Energy and Fuel Standards**

- Enact high state renewable portfolio standards
- Pass a national renewable portfolio standard and support biofuels legislation
- Build support for a regional market for renewable energy certificates
- Accelerate the research on and use of cellulosic ethanol
- Facilitate joint purchasing initiatives to drive market transformation

## **Encourage Energy Efficiency and Conservation**

- Expand rate-payer funding for energy efficiency
- Move closer to best practice state energy efficiency standards and codes
- Foster joint purchasing initiatives for energy efficiency
- Create new vehicles for investment in public building energy efficiency
- Decouple utility sales and profits
- Find the levers to promote energy efficiency through ISOs
- Pass carbon performance standards

## **Increase Transportation Efficiency and Conservation**

- Pass clean car and fuel economy standards in Illinois
- Aggregate purchasing power for fleets and fueling
- Get smart growth and transportation demand on the GHG agenda
- Find a way to help the U.S. auto companies to improve fuel economy

## **Reduce Carbon Emissions from Coal Production**

- Educate stakeholders about the financial risk of pulverized coal plants
- Reduce the pollution from existing coal-fired power plants
- Jointly address the barriers to IGCC with carbon sequestration
- Broker agreements for long-term IGCC contracts

## **Mobilize Support for Terrestrial and Geological Sequestration**

- Support a coordinated terrestrial sequestration initiative

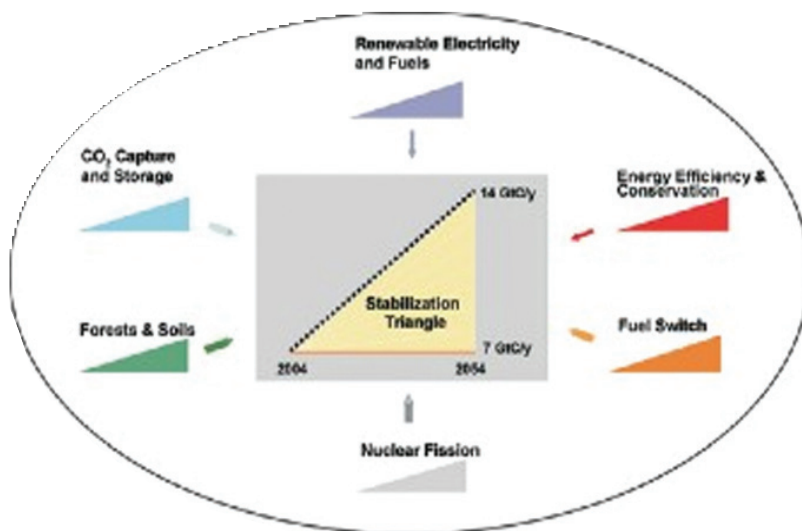
# Clarity about the Climate Challenge

Climate scientists Stephen Pacala and Robert Socolow have popularized the concept of “climate wedges,” first outlined in their 2004 *Science* article on the “stabilization triangle.”<sup>5</sup> The concept is based on the following logic:

- Worldwide carbon emissions are expected to double in the next 50 years, from 7 billion to 14 billion tons of CO<sub>2</sub> per year.
- This predicted upward path will result in CO<sub>2</sub> levels that are triple pre-industrial levels.
- Keeping carbon emissions flat would stabilize the current growth in atmospheric CO<sub>2</sub> levels.
- The area between flat emissions and the predicted upward path is shaped like an open triangle.
- Additional reductions will be required beyond stabilization, but flattening emissions growth is a good starting point.

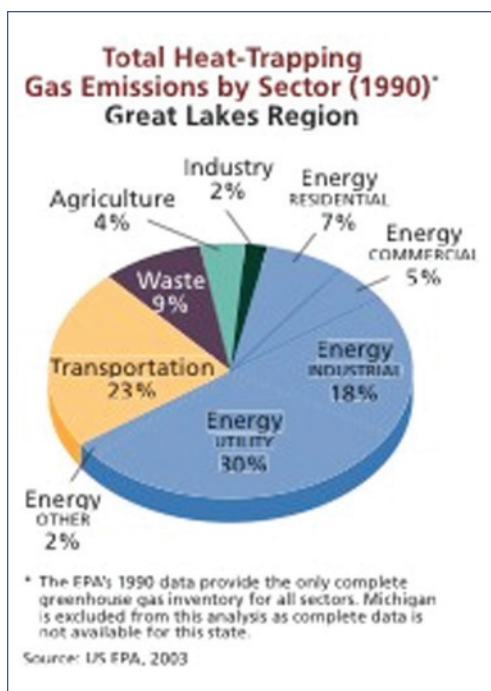
Pacala and Socolow refer to each billion-ton saving of CO<sub>2</sub> emissions as a “wedge.” Seven wedges represent a good first step toward stabilizing global carbon emissions. For example, increasing automotive fuel efficiency is a potential wedge. Doubling the mileage of all cars projected to be operating worldwide in 2055 from 30 to 60 miles per gallon will save one billion tons of CO<sub>2</sub> annually.

## Carbon Mitigation Initiative Stabilization Wedges



*Note: CO<sub>2</sub> Capture and Storage includes geological sequestration. Forests & Soils includes terrestrial sequestration.*

<sup>5</sup> Stephen Pacala and Robert Socolow, “Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies,” *Science*, Aug. 13, 2004, vol. 305, no. 5686, pp. 968–972.



Some measures for reducing carbon emissions are already being considered or adopted. Illinois is poised for progress on a number of wedges, including energy efficiency, such as an energy efficient residential building code, funding for energy efficiency retrofits of public buildings, and “clean” vehicle standards; renewable energy, such as a renewable portfolio standard and more funding for cellulosic ethanol; fuel switching/clean coal, such as funding for integrated gasification combined cycle (IGCC) with carbon capture and sequestration; and carbon sequestration, such as credits to farmers for conservation practices.

Pacala and Socolow point out that the best mix of wedges and strategies will vary by region, depending upon cost, emissions reduction possibilities, and political support. Identifying the most significant sources of GHG is a first step. In the Great Lakes area, the main sources of GHG emissions are detailed in the figure at left. Just stabilizing emissions will require major changes in each sector in the figure. The reductions called for by Socolow and Pacala are not as large as most people believe

necessary, and some experts believe that certain actions can produce even greater emissions reductions than Socolow and Pacala estimate. Nonetheless, the “wedge” framework provides a useful way of understanding the actions necessary to reduce GHG emissions.

Midwest opportunities to contribute to a Socolow wedge include:

**Clean Coal:** Utilities account for 30% of Great Lakes region GHG emissions. Seventy percent of the Midwest’s electricity is produced from coal, and Midwest coal plants produce 20% of U.S. utility-caused CO<sub>2</sub> emissions. Greenhouse gas emissions from coal are an increasingly serious concern as Midwestern states, with ample coal resources and a desire to capitalize on high energy prices, intend to build dozens of new coal-fired power plants. Most of the proposed plants lack the technology to capture carbon emissions, potentially locking in high emissions for decades. Emerging technologies for coal-fired power using gasification could create a Midwest clean coal sector, but more research is needed to perfect the process and bring down its cost. The governors of Ohio, Indiana, and Illinois are actively supporting clean coal research and commercialization. American Electric Power (AEP) announced in March 2007 that it would add carbon sequestration capacity to two of its existing coal-fired plants.

**Energy Efficiency and Conservation:** Achieving a wedge from energy efficiency and conservation would not pose great difficulty, yet energy efficiency is a missed opportunity for the Midwest. Only Ohio, Illinois, and Wisconsin have adopted the International Energy Conservation Code (IECC) for the construction of new commercial buildings. With deregulation, many Midwest utilities ended programs to encourage customers to buy energy efficient products. The benefits of energy efficiency are obvious: a high return on investment for the customer, lower energy costs systemwide (because new power plants don’t need to be built), and increased profits for the many Midwest producers of energy efficient appliances, controls, and engines. As pointed out by James Rogers, chief executive of Duke Energy, “The most efficient and environmentally responsible plant you



can build is the one that you don't build" because of investments in energy efficiency.<sup>6</sup>

States and cities are showing increased interest in breaking down the institutional barriers to energy conservation and setting higher standards for energy efficiency. Gov. Jim Doyle of Wisconsin signed the Energy Efficiency and Renewables Act in March 2006, which increased funding to local governments for energy efficiency projects and requires Wisconsin utilities to directly support energy efficiency programs, ensuring that \$85 million a year will be spent promoting energy efficiency. Wisconsin is a model for third-party implementation of energy efficiency programs, such as public benefit funds. Public benefit funds are typically state-level programs developed through the electric utility restructuring process as a measure to assure continued support for renewable energy resources, energy efficiency initiatives, and low-income support programs. These funds are also frequently referred to as a system benefits charge, or SBC. Such a fund is most commonly supported through a charge to all customers on electricity consumption.

Minnesota also is a leader in its shareholder incentives for utilities that exceed energy efficiency goals. Gov. Tim Pawlenty has urged other governors to raise their states' awareness of efficiency and to educate the public in energy conserving practices. The Minnesota Public Service Commission is working with the U.S. EPA and utilities on additional steps to promote energy efficiency, including looking at decoupling the link between utility profit and sales.

**Transportation Efficiency and Conservation:** The Midwest is home to a large part of the U.S. auto industry, which has declined to embrace efficient technologies. In other areas, however, the region is showing interest in transportation conservation. The Midwest is a national leader in the development of alternative fuels, states are committing to purchases of efficient cars, and Illinois is considering raising its emissions standards for cars – legislation that would be a landmark in the region.

One-third of the nation's freight passes through Chicago, the nation's largest inter-modal hub. Improving Midwest rail freight efficiency is critical to managing GHG emissions regionally and nationwide. Without it, truck traffic, emissions, and congestion will continue to build. But efficiencies can be gained within the freight system. Every container that passes through Chicago has to be transferred to a truck and driven from one rail line to another, and currently freight trains spend hours idling outside Chicago waiting for their turn to enter the city. Proposals for improving this system are under review.

Regional rail can also reduce emissions. The Center for Neighborhood Technology (CNT) and the Center for Clean Air Policy (CCAP) estimate that the annual GHG benefits of regional rail in the Midwest are substantial, if current plans for high-speed rail development are implemented. Studies by the Center for Transit Oriented Development and CNT show that demand for housing near transit is much greater than supply. People who live near transit tend to drive less, so efforts to improve public transit and promote transit-oriented development also will play a critical role in managing Midwest GHG emissions.

**Renewable Energy and Fuels:** All of the Midwest states are promoting ethanol, biodiesel, and wind alternatives, seeing in them the potential to bolster farm incomes, reduce reliance on imported fuels, and develop new industrial sectors and jobs. However, not all states have enacted policies to help build these sectors. Some states, for example, do not have renewable portfolio standards. Variations in state regulations and incentives

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<sup>6</sup> Steve Lohr, "Energy Use Can Be Cut by Efficiency, Survey Says," *nytimes.com*, Nov. 29, 2006.

throughout the region limit the spread of wind power. The energy required to produce corn-based ethanol is nearly as much as the energy ethanol produces, which calls into question the amount of regional investment that should be made in corn-based ethanol production, now at a level that may soon exceed market demand. An alternative – cellulosic ethanol made from switch grass, corn husks and other crop waste – is attracting research and investment dollars.

**CO<sub>2</sub> Capture and Storage:** Indiana and Illinois have limestone caverns that may be suitable for storing carbon. These states and Ohio are supporting research and development on geological sequestration.

**Forests and Soils:** Government and farm associations show great interest in trapping carbon through agricultural conservation practices and forestry. Illinois, Indiana, and Ohio are working with the Chicago Climate Exchange (CCX) to help farmers receive GHG emissions reduction credits for conservation practices.

**Nuclear Fission:** A Socolow wedge could be achieved through substituting nuclear power for coal, but the achievement would require tripling the installed nuclear capacity and the nuclear power output by 2054. There also would be the need to dispose of three times as much nuclear waste. The prospects for nuclear energy as an option for reducing GHG emissions have been limited by high relative costs; perceived adverse safety, environmental, and health effects; potential security risks stemming from proliferation; and the unresolved challenges in long-term management of nuclear wastes.<sup>7,8</sup>

### *Near-Term Opportunity: Midwest Socolow Wedge Analysis*

Strategies now in play fit all of the wedges, but not nearly enough is being done to avoid “dangerous impacts” as defined by the United Nations Framework Convention on Climate Change. Many variables contribute to determining what could be viewed as a “safe” level of GHG emissions and what reductions would be required to achieve those levels, but overall the figure of 80% reduction below 1990 levels by 2050 is a consistently identified goal. To achieve such an ambitious goal, the region needs more strategic goal-setting and better scorekeeping. The Midwest lacks measurement tools that would highlight gaps in efforts and assess progress resulting from the disparate actions being taken by cities, states, and companies.

A good first step would be to produce a Midwest Socolow wedge analysis to identify which strategies in what proportions are needed to achieve this level of GHG emissions. Illinois, Michigan, Missouri, and Minnesota already have prepared emissions inventories that help to identify important sectors for reductions. The World Resources Institute is working with companies and states in the region on new inventories and strategies to reduce emissions.

A wedge analysis will help not only in developing state and local action plans, but also in building support for a national cap and trade policy (described in the next section, “Accounting for GHG Emissions Reductions”). A wedge analysis by Congressional district that quantifies the costs of not acting and the economic benefits of action could convince legislators to support federal climate action.

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<sup>7</sup> John Deutch and Ernest Moniz, *The Future of Nuclear Power: An Interdisciplinary MIT Study*, Massachusetts Institute of Technology, July 2003.

<sup>8</sup> *Union of Concerned Scientists*, *Nuclear Power and Global Warming*, March 2007.

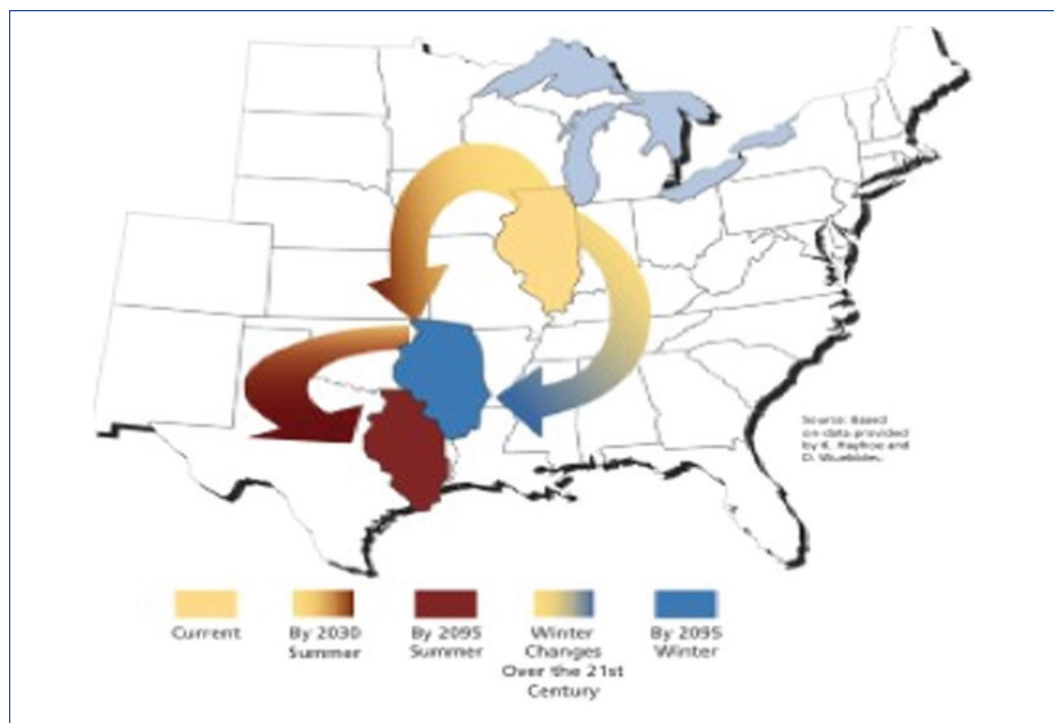


### ***Mid-Term Opportunity: Understand Midwest Climate Impacts***

In 2003, the Union of Concerned Scientists commissioned research by leading climate scientists on the impact of global warming on the Midwest.<sup>9</sup> The report suggested that the impact of doing nothing would be severe (see figure below).

A new analysis that captures the lessons learned about climate change in the four years since the UCS study would inform the discussion about the Midwest stake in taking action. The analysis should be informed by the next Intergovernmental Panel on Climate Change report, to be issued in 2007. Serious discussion will help leaders and the public to confront the changes they must make to avoid the worst impacts. It also will enable local government officials to identify changes in state and federal policy needed to manage new risks to buildings, transportation, and water infrastructure.

An immediate audience for this research is Midwestern mayors, who have already demonstrated concern about the effects of higher temperatures on public health, quality of life, water supply, ecosystems, and infrastructure. At meetings of the Great Lakes and St. Lawrence Cities Initiative, the mayors' discussions increasingly are focused on climate change, energy, sustainability, and green infrastructure. Nine Great Lakes jurisdictions – Ann Arbor, Buffalo, Chicago, Milwaukee, Duluth, Minneapolis, Saint Paul, Toledo, and Toronto – are working with the International Council for Local Environmental Initiatives (ICLEI) to identify policy solutions that link climate and water. The City of Chicago is working on a climate mitigation and adaptation plan that could become a model for other large urban areas.



<sup>9</sup> *Union of Concerned Scientists, Confronting Climate Change in the Great Lakes Region, April 2003.*

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# Accounting for GHG Emissions Reductions

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California and the Northeastern states already have “cap and trade” systems for emissions reductions, and a national system is expected to be in place within five years. Under cap and trade, maximum emissions allowances (authorizations to emit) are allocated to affected sources, and the total number of allowances cannot exceed that cap. The only requirements are that sources (a) accurately measure and report all emissions and (b) demonstrate that they own the same number of allowances as their emissions. Emitters can choose to reduce their emissions or buy allowances from other sources that have reduced their emissions below their caps.

Cap and trade depends on accounting and audit systems to ensure that reductions are real, permanent, and only counted once. For cap and trade to be successful, controversies about accounting practices will have to be resolved. The accounting rules developed for the Chicago Climate Exchange’s (CCX) voluntary program will inform the national debate, though it is expected that the federal standards will differ from the current CCX standards.

## ***Near-Term Opportunity: Encourage States to Join the Multi-State Climate Registry***

A GHG registry would give companies a benchmark from which to establish a GHG emissions baseline. Any future mandates could be guided by this baseline. The Lake Michigan Air Directors Consortium (LADCO), WRI, ELPC, UCS, and others are recruiting Midwest states to design and join a Multi-State Climate Registry. This registry, along with existing registries in California and the Northeast, would lead to a *de facto* national registry with a common set of rules. A Midwest registry is expected to be in place in the next two years.

## ***Near-Term Opportunity: Agree on Accounting for Reductions and Offsets***

One of the most important concepts in accounting for emissions reductions is “additionality.” According to the Kyoto Protocol Articles on Joint Implementation and the Clean Development Mechanism, emissions reduction units (ERUs) will be awarded to project-based activities, provided the projects achieve reductions that are “additional to those that otherwise would occur.” Additionality is very difficult and often expensive to demonstrate. If additionality standards are too stringent, worthwhile carbon reduction projects will not be pursued. If additionality standards are too loose, the market will be flooded with projects that produce phantom GHG emissions reduction benefits.

The Chicago Climate Exchange (CCX) is the world’s first legally binding GHG emission registry, reduction, and trading system. It has traded all six GHGs since 2003. CCX members, who helped shape its standards, make a legally binding commitment to reduce their emissions based on a specified baseline and reduction schedule. Members who exceed their commitments may sell allowances to other members. Members who do not meet their commitments must buy allowances from other members. Of the 100 or more voluntary CCX participants, members from the Midwest include Ford Motor Co. in Dearborn, Michigan; Motorola in Schaumburg, Illinois; Baxter International in Deerfield, Illinois; Schneider Electric U.S. in Palatine, Illinois; the University of Iowa in

Iowa City; the University of Minnesota in Minneapolis-Saint Paul; the City of Chicago; the State of Illinois; and individual farmers in Iowa, Illinois, and Indiana, including Sen. Richard Lugar. By joining the CCX, members agree to track emissions, a practice that in and of itself is instructive.

Some critics argue that the CCX additionality requirements are insufficient. They also want to ensure that any federal standards are broader than the CCX standards.<sup>10</sup>

The more Midwest companies, governments, and civil society groups can agree upon accounting standards, the more likely it is that states will have consistent standards and the easier it will be to move federal legislation forward.

### ***Near-Term Opportunity: Give the Public Better Tools to Guide Action***

Public opinion polls are showing a shift in attitudes about climate change.<sup>11</sup> A Zogby International post-election poll found that half of Americans who voted in the 2006 mid-term elections said concern about global warming affected their votes. Fifty-eight percent agreed that their elected officials should make combating global warming a high priority.<sup>12</sup> Environment Illinois, which canvasses 60,000 people, has found that respondents increasingly express concern about the global effects of climate change. These polls seem to indicate that citizens want to make a difference.

The public is increasingly bombarded with guides on how to calculate and modify their “carbon footprint” and with advertisements promoting the value of carbon offsets, which are donations to clean-energy projects that compensate for one’s own pollution. While this is positive in many ways, it also has its risks. Some offset programs may not produce real reductions in GHG emissions. Accounting and monitoring practices vary widely. As the public begins to hear criticism of offset programs, people may become more reluctant to act. Also, some critics argue that offset programs simply distract people from bigger reforms in the use of energy and discourage more difficult changes in behavior.

People will be more likely to act if they are given robust tools, including better regulation and ways of monitoring and offsetting their emissions. An example is Civic Footprint, a Web-based tool being developed by The Center for Neighborhood Technology, with which users will be able to consider calculate the impact of specific actions they might take on emissions, energy savings, and cost savings. The site will build a community by linking users to others in their neighborhood who are considering similar commitments. The City of Chicago is testing Civic Footprint with CNT and the Conservation Corps.

Various public, private, and social sector initiatives are underway to encourage Midwesterners to reduce their GHG emissions. The City of Chicago informs people about how they can save energy and plans more outreach to its citizens. Companies such as Wal-Mart and Target have marketing campaigns to promote energy efficient products such as compact fluorescent light bulbs and to help customers reduce their energy bills. Environment Defense has a national media campaign that dramatically shows the bur-

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<sup>10</sup> Jeff Goodell, *Capital Pollution Solution?* The New York Times Magazine, July 30, 2006.

<sup>11</sup> Time/ABC News/Stanford University, Mar. 26, 2006; Civil Society Institute/40MPG.org, March 15, 2006; Ayres McHenry, March 2, 2006; The New York Times/CBS, Feb. 28, 2006; FOX News/Opinion Dynamics Corp., Nov. 9, 2005; and others.

<sup>12</sup> Zogby Post-Election Poll: Dems Gained from Global Warming Debate, Nov. 16, 2006.

den that failure to act places on future generations. Each month, ELPC uses email and its Website to publicize actions individuals can take, from switching to fluorescent light bulbs to buying hybrid cars. MTV believes that its regular educational spots have helped to make the environment and climate the top concern of 14- to 16-year-olds. A public art exhibition and educational initiative called Cool Globes: Hot Ideas for a Cooler Planet will make its debut in Chicago in summer 2007. The exhibit will display dozens of large globe sculptures, each themed with a solution to global warming.

But how effective will these efforts be? Significant reductions are more likely with a concerted, coherent approach rather than many overlapping and possibly confusing efforts. What is needed is a program of public engagement involving many actors, a uniform approach to measuring emissions and assessing the value of actions, and an infrastructure for taking action.

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## Commitments to GHG Emissions Reductions

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**I**n late 2006, Gov. Arnold Schwarzenegger signed a comprehensive program of regulatory and market mechanisms to reduce California's GHG emissions by 25% by 2020. He called on the Western Governors Association to take a regional approach to meeting energy needs while protecting the environment and has asked the state to form a GHG trading partnership with the Northeast Regional Greenhouse Gas Initiative (RGGI), the multi-state GHG cooperative spearheaded by former Gov. George Pataki of New York.

The Midwest states are unlikely to pursue anything like the RGGI approach to regional cap and trade in the foreseeable future. Until now, Midwest governors have not provided the leadership for the region to adopt a cap and trade system, although several Midwest states could commit to GHG reductions in the next few years. Action in one state will make it easier for others to follow, and help pave the way for a regional or, preferably, national cap and trade system.

### ***Near-Term Opportunity: Secure State Commitments to Limiting GHG Emissions***

In February 2007, Gov. Rod Blagojevich of Illinois announced a statewide goal to slash the production of heat-trapping GHGs to 1990 levels by 2020 and 60% below 1990 levels by 2050. He formed the Illinois Climate Change Advisory Group to identify cost-effective strategies to meet this goal. Several dozen state legislators have pledged support thus far. Such a cap would help to ensure that new conventional coal plants are not built and that efficiency and renewable energy sources find a market in Illinois.

In January 2007, Gov. Jim Doyle of Wisconsin announced plans to appoint a global warming task force and create an energy independence office to coordinate an effort to dramatically expand the state's use of renewable energy by 2025. Doyle plans for the state to invest more in wind power, ethanol, and other sources of renewable energy with the help of grants, loans, and tax credits. In his campaign for governor, Doyle said Wisconsin would use renewable energy for 25% of its electricity and 25% of its transportation fuels by 2025.

Gov. Tim Pawlenty of Minnesota introduced the Next Generation Energy Initiative in December 2006. The initiative includes strategies to increase renewable energy use to 25% by 2025, increase energy conservation, and decrease carbon emissions from Minnesota. Pawlenty has proposed increasing the number of E85 pumps, increasing Energy Star buildings, raising the state's Renewable Energy Objective, promoting cellulosic ethanol and other biomass technology, and reducing fossil fuel energy use by 15% by 2015. He also proposed beginning a stakeholder process with the help of the Center for Climate Strategies to identify ways that the state can reduce emissions efficiently and cost-effectively. Fresh Energy, an advocacy group based in St. Paul, is pushing for a global warming plan for Minnesota.

Momentum is building in all of these states. It will become clearer later in 2007 what will be possible in which Midwestern states. Outside the region, both New York and

Oregon started down the path of controlling emissions by first setting a reduction goal.

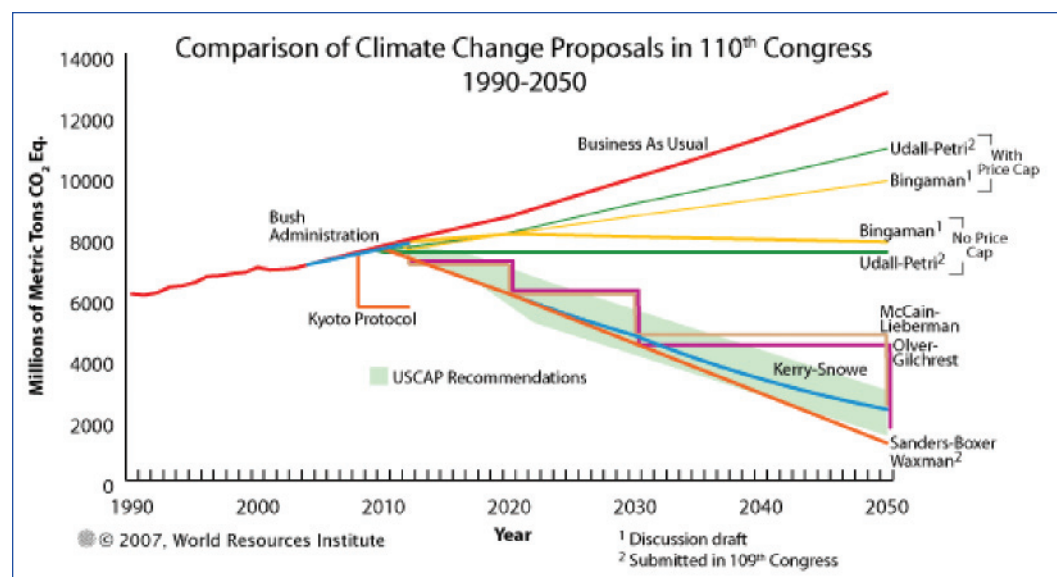
***Near-Term Opportunity: Build on the Commitments of Midwest Mayors***

Dozens of Midwest mayors have signed the U.S. Mayors Climate Protection Agreement, a measure spearheaded by Seattle Mayor Greg Nickels and jointly executed by ICLEI, Local Governments for Sustainability, and the U.S. Conference of Mayors. The agreement commits the cities to meet the Kyoto goal of reducing GHG emissions to 7% below 1990 levels by 2012. Cities, including Chicago, are beginning to look beyond Kyoto. Chicago is coordinating with other cities, not only through the Clinton Climate Initiative, which includes the world's 40 largest cities, but also through the Mayors' Federal Climate Policy Framework and other opportunities for exchange among cities. Early in 2007, ICLEI will open its Midwest Regional Capacity Center in Des Moines, Iowa, from which it will focus on accelerating GHG reductions by working directly with the region's cities. If city efforts are harmonized with state efforts, it will be possible to leverage investments and align policies.

***Near-Term Opportunity: Midwest Support for Federal Cap and Trade***

Regional politicians and corporate executives increasingly agree that there will be a nationwide cap and trade system after 2008, if not sooner. The pressure to act is growing as a result of mounting evidence of climate change, the failure of voluntary steps to end the growth of U.S. GHG emissions, and the expiration of the Kyoto Protocol in 2010.

The chances of national climate action have increased – but are not assured – with the 2007 changes in Congressional leadership. It is very likely that, by 2008, the House and Senate will pass renewable energy legislation that will have a positive effect on global warming. However, meaningful action on cap and trade or carbon taxes before 2009 depends on President Bush and the legacy he wants to leave. House Speaker Nancy Pelosi has appointed a Select Committee on Global Warming and Energy Independence, chaired by Massachusetts Rep. Ed Markey, and Rep. John Dingell from Michigan has shifted his position to support a cap and trade system, a significant move given his ties to the auto industry. However, the several bills currently under consideration would have





widely differing impact on GHG reductions.

Midwest business executives, elected officials, and other prominent leaders could speed the process of reform by issuing a clear public statement declaring support for a national cap and trade system. The mayors of Chicago, Gary, Rochester, Minneapolis, Duluth, Ann Arbor, Grand Rapids, Cincinnati, Dayton, and Toledo are already signatories of the U.S. Mayors Climate Protection Agreement. Others already on board include evangelical Christian leaders who are urging action to cut carbon dioxide emissions and numerous faith coalitions concerned about climate change.

In January 2007, ten major corporations, including Caterpillar, BP America, Duke Energy, and GE, joined four national environmental groups to form the United States Climate Action Partnership, which is calling for a federal cap on carbon emissions. Midwest companies already on record as welcoming or accepting mandatory caps on their GHG emissions include the Boeing Co. in Chicago; American Electric Power Co. in Columbus, Ohio; Maytag Corp. in Newton, Iowa; 3M Co. in Saint Paul, Minnesota; Whirlpool Corp. in Benton Harbor, Michigan; Wisconsin Energy Corp.; SC Johnson in Racine, Wisconsin; and Cummins Inc. in Columbus, Indiana. All of these companies are Midwest corporate members of the Pew Center on Global Climate Change.

This is an opportune moment for the formation of a Midwest task force on climate change and energy policy. Climate change legislation limiting GHGs is considered highly likely between 2008 and 2010. It almost certainly will be a broad policy proposal that factors in energy security and economic concerns. A Midwest task force composed of leaders in business, government, unions, and civil society could guide and stimulate Midwest policymakers, tie individual state conversations together, and build a regional consensus that could have significant impact on federal policy.

A multi-stakeholder and issue initiative could build upon the many efforts already underway to support a cap and trade system. The Council of Midwest Governors is beginning a dialog to prepare for a 2008 policy debate about global warming, renewable energy, energy efficiency, and clean coal, among other topics. Energy Transition 2050, a biannual conference facilitated by the Wisconsin Energy Center, will provide a 2007 forum for advocates, utilities, businesses, and policymakers to address energy transition issues, including buildings and transportation. Powering the Plains, an initiative of the Great Plains Institute, has been bringing together “odd bedfellows” to develop policy, demonstrate promising technologies, identify research aimed at commercialization, educate key audiences, and transform climate change and other environmental concerns into economic development opportunities. The Renewable Energy Alignment Mapping Project is a six-state collaboration involving thirty non-profits and eight foundations that uses systems analysis to align global warming solutions for electric power in the Upper Midwest. The goal is Midwest leadership in 21st century clean energy, resulting in an 80% decrease of electricity sector global warming emissions by 2030.



***Near-Term Opportunity: Demonstrate the Costs for Congressional Districts***

If lawmakers had better economic data supporting climate change action, they would be bolder in supporting related legislation. The Safe Climate Act (H.R. 5642) is just one example. Introduced in June 2006 by Rep. Henry Waxman of California, the bill urged clean energy solutions and the reduction of U.S. GHG emissions by 15% by 2020 and by 80% by 2050.<sup>13</sup> Midwest legislators would be more inclined to support it if they knew the costs to their districts of not acting and the benefits to their constituents of early action. A good start would be to pick three Congressional districts with different conditions to demonstrate impacts.

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<sup>13</sup> In Illinois, Representatives Jan Schakowsky, Jesse Jackson Jr., Danny Davis, Luis Gutierrez, and Rahm Emanuel were among the representatives who supported the bill.

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# Renewable Electricity and Fuels

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Rising fossil fuel prices, concerns over energy security, and discussions about peak oil<sup>14</sup> and the future of the oil economy are contributing to interest in renewable energy. A 2006 study commissioned by the Energy Future Coalition found that renewable energy could produce 25% of U.S. electric power and motor vehicle fuels by 2025 at no additional cost to the economy.<sup>15</sup> Use of renewable energy at that level would cut petroleum consumption by 2.5 million barrels a day and eliminate one billion tons of CO<sub>2</sub> emissions every year – an entire Socolow wedge at little or no additional cost.

For renewable energy to play such a major role, the productivity of technologies for extracting and distributing it must improve at least 20% in the next 20 years relative to fossil fuel technologies. This is less than half of the 45% improvement projected by the National Renewable Energy Laboratory. This scenario assumes that oil prices will not fall significantly below U.S. Energy Information Administration projections.

The potential economic benefit to state economies is great. In 2005, global wind and solar markets reached \$11.8 billion and \$11.2 billion, up 47% and 55% respectively from a year earlier. The market for biofuels rose to \$15.7 billion globally, up more than 15% from the previous year. It is estimated that the clean energy market will grow from \$39.9 billion currently to \$167.2 billion in 2015.<sup>16</sup>

These trends and forecasts explain the huge political interest in the renewable energy sectors: ethanol, biodiesel, wind, combined heat and power, distributed energy, and clean coal. Iowa, Illinois, Ohio, and other states have set a goal of becoming top producers of alternative energy. The governors of Illinois and Wisconsin have formulated plans for energy independence. Michigan and Indiana have alternative energy plans under development.

Pennsylvania Gov. Edward Rendell ably demonstrated how a state can promote alternative energy technologies. His successful formula consists of five strategies:

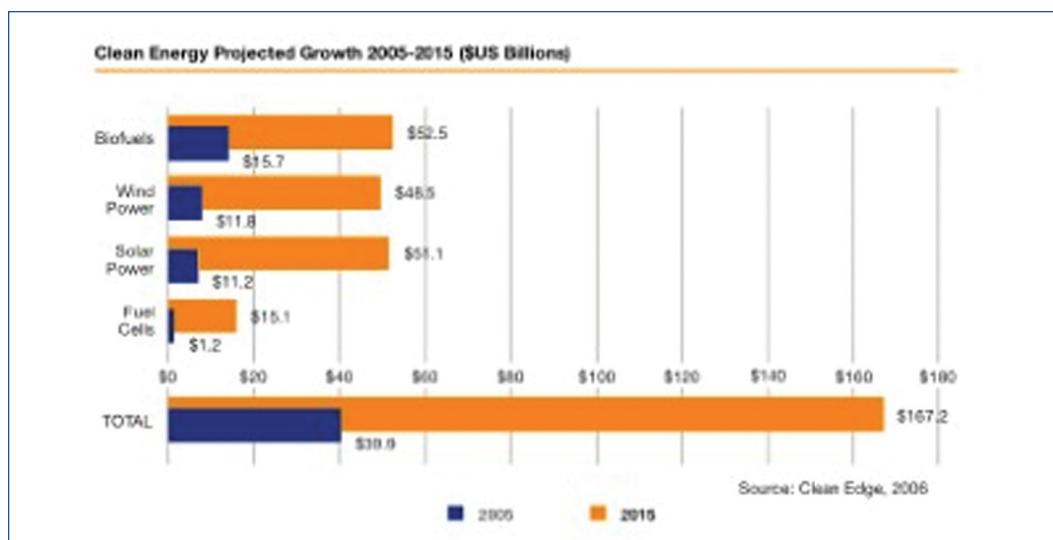
- 1) Mandate the use of alternative energy.
- 2) Use state purchasing power to guarantee a market for alternative energy.
- 3) Provide alternative energy companies access to the tax-exempt financing market.
- 4) Allocate state funds for targeted investment capital.
- 5) Mobilize other investor commitments through the personal intervention of the governor and other state leaders.

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<sup>14</sup> *The Hubbert peak theory, also known as peak oil, is an influential theory concerning the long-term rate of conventional oil and other fossil fuels extraction and depletion. It predicts that future world oil production will soon reach a peak and then rapidly decline. The actual peak year will only be known in retrospect.*

<sup>15</sup> *Rand Corporation, Impacts on U.S. Energy Expenditures of Increasing Renewable Energy Use, 2006.*

<sup>16</sup> *Carbon Disclosure Project press release, "The \$31.5 Trillion Question: Is Your Company Prepared for Climate Change?", Sept. 18, 2006.*



### ***Near-Term Opportunity: State Renewable Portfolio Standards***

Using current technology, two million additional windmills would be required world-wide to provide one Socolow wedge. While this suggests a landscape covered with windmills, the actual area required would be equal to about 3% of U.S. land area. With its flat, open expanses, the Midwest – particularly Minnesota, Illinois, Iowa, Michigan, Ohio, and Wisconsin – could play a big role in providing a wind power wedge.

The passage of high renewable portfolio standards (RPS) would provide a significant boost to both wind and solar energy production. An RPS requires that a percentage of the electricity supplied by generators be derived from a renewable source. In February 2007, the Minnesota legislature passed the strongest renewable energy standard in the United States. It requires the state's energy companies, except Xcel Energy, to provide 25% of their power through renewable sources by 2025. Xcel, which represents about half the state's electricity, would generate 30% renewable energy by 2020. Republican Gov. Tim Pawlenty has promised to sign this legislation into law. Minnesota has set the bar for other Midwestern states. In Wisconsin, recent RPS legislation requires 10% of electricity from renewable energy sources by 2015. In Illinois, Gov. Blagojevich has proposed an 8% RPS by 2010. All of the Midwest states have an interest in renewable energy. Their goals for market development will be realized more quickly if they follow Minnesota's lead.

The November 2006 elections improved the chances of passing renewable portfolio and renewable fuels standards. The governors of Illinois, Michigan, Minnesota, Wisconsin, and Indiana were re-elected. Democratic gubernatorial candidates committed to renewable energy were elected in Iowa and Ohio. Democrats picked up nearly 320 state legislative seats, creating new majorities in the Iowa House and Senate, the Indiana House, the Minnesota House, the Michigan House, and the Wisconsin Senate.

In 2007, the governors of Illinois, Indiana, Ohio, Iowa, Michigan, and Minnesota will propose energy packages to their state legislatures. The governors of Michigan and Indiana are creating energy plans to reduce reliance on fossil fuels through alternative and renewable sources of energy and energy efficiency. The governors of Illinois and Wisconsin have unveiled comprehensive energy independence plans. A number of states, including Michigan, Wisconsin, Illinois, and Indiana, still are considering new or stron-

ger RPSs and renewable and biofuels standards.

Thus 2007 presents an important opportunity to pass renewable portfolio and renewable fuels standards, to increase research and development, to enhance incentives, and to eliminate state-by-state differences in standards.

### ***Near-Term Opportunity: Federal Support for Renewable Energy***

Twice the U.S. Senate has passed a national renewable energy standard that subsequently died in conference committee. Under Democratic leadership, renewable energy legislation is likely to pass in 2007 or 2008, more funds will be allocated for renewable energy research, and the cap on efficient vehicle tax credits may be lifted, assuming the legislation is not vetoed.

The 2007 Farm Bill reauthorization represents the biggest renewable energy opportunity. The new bill will have a strong focus on biofuels, cellulosic ethanol, rural wind and solar power, and biobased products. Sen. Tom Harkin of Iowa, who chairs the Senate Agriculture Committee, sees these areas as important for rural development, energy security, and farm income. Midwest farm leaders and broad coalitions such as 25x'25 are likely to play a big role in shaping a flurry of biofuels proposals. Environmental organizations such as ELPC already are organizing regional meetings to develop shared priorities for the Farm Bill, paying particular attention to the importance of emphasizing that biofuels are the most efficient to produce.

### ***Mid-Term Opportunity: A Regional Market for Renewable Energy Certificates***

The passage and harmonization of renewable portfolio and fuels standards in the region could lead to a Midwestern market for trading renewable energy certificates, a development that would offer a larger market to energy suppliers and allow them to choose the least expensive pathway to meeting requirements for supplying renewable energy. The Izaak Walton League and the Great Plains Institute are working on a Midwest Renewable Energy Tracking System (MRETS), a proposal that would have member states recognizing each other's renewable energy certificates, thus allowing trading across state lines.

### ***Near-Term Opportunity: Research and Adoption of Cellulosic Ethanol***

Eighty percent of all ethanol is produced in the Midwest and Great Plains states. The Midwest states, including Illinois, Minnesota, Iowa, and Indiana, are committed to being leaders in corn ethanol production. Private investors have plans for dozens of additional processing plants even without state investment.

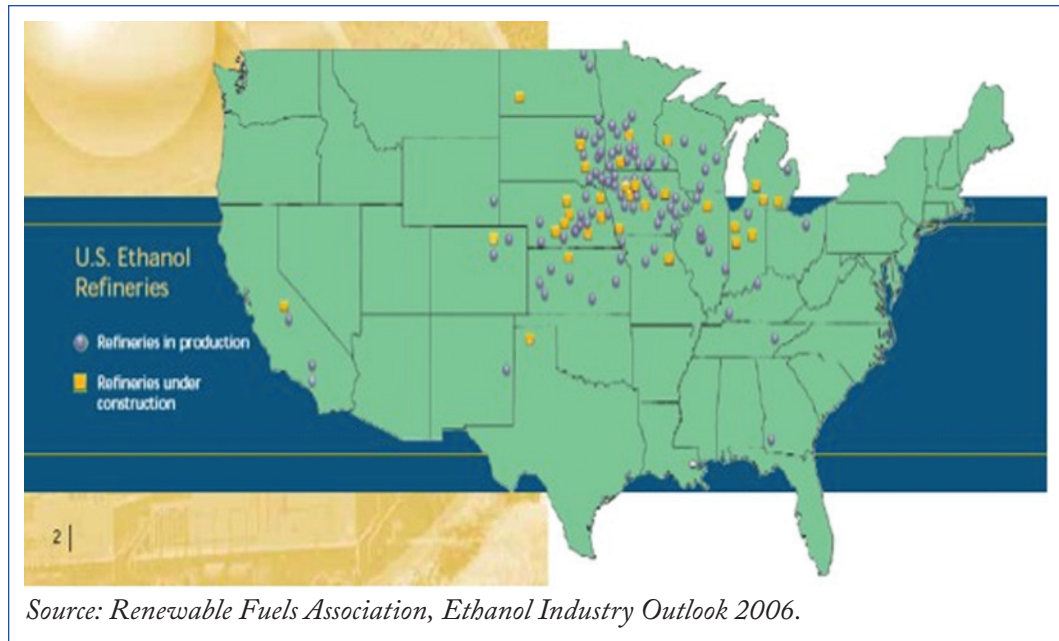
Ethanol made from corn kernels, however, produces at best only a 10-20% energy savings<sup>17</sup> using current technologies. Some scientists, in fact, see no net gain.<sup>18</sup> Increasing corn ethanol production will have adverse effects on soil quality, water use, and food prices for humans and livestock.

While biomass fuels are a boon to certain sectors of the agricultural industry and reduce reliance on fossil fuels, CO<sub>2</sub> benefits will come mainly from cellulosic sources of ethanol, which are nearly carbon neutral. Cellulosic ethanol made from grasses, wheat

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<sup>17</sup> Union of Concerned Scientists, *Ethanol: Frequently Asked Questions*, 2006.

<sup>18</sup> Katharine Sanderson, *A Field in Ferment*, *Nature*, Vol. 444, 7 Dec. 2006.



straw, rice straw, corn husks, corn stalks, and other crop wastes requires 60-70% less energy to produce than corn kernel-based ethanol.<sup>19</sup> According to a recent report from the U.S. Department of Agriculture and U.S. Department of Energy, cellulosic ethanol could displace at least 30% of the nation's petroleum consumption by 2030.

Increasing production of cellulosic ethanol will require the development of cleaning technology and incentives to boost commercialization. Legislative authorizations have already earmarked hundreds of millions of research and development dollars, supplementing research funds provided by corporations. The Energy Policy Act of 2005 created a cellulosic biomass program aimed at producing 250 million gallons by 2013, and funded grants and incentives to support production of the first billion gallons of annual cellulosic ethanol. The 2007 Farm Bill is expected to provide additional support, possibly including tax subsidies,<sup>20</sup> and legislators in Wisconsin, Minnesota, and Iowa will vote on state funding packages this year. Cellulosic production would also be stimulated if a federal 10% renewable fuels standard were passed, as demand for renewables would be higher than the nation's ability to produce corn ethanol.

In fall 2006 BP announced a \$500 million commitment to establish an Energy Bioscience Institute based at the University of Illinois, the University of California-Berkeley, and the Lawrence Berkeley National Laboratory. The institute will support renewable energy research, starting with renewable biofuels for road transport. Iowa State University, Purdue University, and the University of Minnesota also are conducting research on cellulosic ethanol. With grants to the Institute for Agriculture and Trade Policy and Powering the Plains, the Energy Foundation is supporting initiatives to advance state policies and develop standards for best practices for cellulosic ethanol production.

<sup>19</sup> *DesMoinesRegister.com*, "Iowa to Be Site of Nation's First Major Cellulosic Ethanol Plant, Nov. 22, 2006.

<sup>20</sup> *Associated Press*, "Ag Secretary Johanns Promotes Emerging Ethanol Technology," Oct. 25, 2006.

Farmer-owned ethanol cooperatives as well as Midwest corn ethanol industries find cellulosic ethanol attractive, as it represents a cheaper feedstock. Iogen, BP, Chevron, Cargill, and Dupont are all investing, and Broin Companies announced in November 2006 that it will build the world's first commercial-scale cellulosic ethanol plant in Iowa.<sup>21</sup>

The Cellulosic Ethanol Summit, which convened in Washington, D.C., in November 2006, increased momentum for the creation of a national cellulosic ethanol industry. Sponsored by the Department of Energy, 25x'25, and others, the summit attracted leaders from the agriculture, industrial biotech, chemical, oil, developer, and financial communities. The invitation outlined the primary challenge to progress: "No single community will be able to create a viable cellulosic ethanol industry. Only through intense cooperative efforts will this be possible. This means that all the communities in the value chain will need to obtain a detailed understanding of the capabilities, challenges, and needs of the other communities for the industry to move forward."

A Midwest initiative to build a cellulosic ethanol sector would be helped by additional federal funding or incentives. The Midwest push for cellulosic ethanol must quickly address three issues:

- 1) What are the anticipated energy savings over gasoline? How much water is required for production? What will be the level of emissions?.
- 2) Is it possible to build the infrastructure for cellulosic ethanol production at scale and keep the material dry and clean during transport?
- 3) Who gets the credit for emissions reductions: farmers or processors?

### ***Mid-Term Opportunity: Joint Purchasing to Drive Market Transformation***

Many Midwest mayors, governors, and business leaders are committed to buying green power. A joint purchasing partnership of government, business, and nonprofit organizations could reduce barriers, lower prices, accelerate deployment, stimulate research and development, and promote new technology.

For example, investor concerns about whether demand will match supply in five years could be reduced with a long-term commitment to purchase. Long-term commitments to buy, however, are complicated by the fact that 27 states, including Wisconsin, Minnesota, and the Dakotas, do not offer choice in electricity purchases. Illinois does offer choice, and purchasing commitments already are driving the development of wind power. The state's plan to double its wind energy capacity is tied to an agreement by the state to purchase wind power to supply the majority of its capital city's electricity needs.

A number of intermediaries are ready to help cities, states, and companies purchase and coordinate purchases of renewable energy and buy energy efficient products. Potential facilitators include:

- 1) WRI's Green Power Market Development Group and its Climate Midwest Partnership, a group of major corporations interested in coal gasification<sup>22</sup>, energy efficiency,

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<sup>21</sup> *Des Moines Register.com*, "Iowa Scores an Ethanol Coup", Nov. 21, 2006.

<sup>22</sup> *The WRI Climate Midwest partnership has recruited Archer Daniels Midland, Baker & McKenzie, Baxter International, Caterpillar, Great River Energy, Johnson Controls, Kimberly-Clark, LaSalle Bank, OfficeMax, Stora Enso North America, Target, and United Airlines.*



cellulosic ethanol, and other renewable energy sources

- 2) The U.S. EPA's Green Suppliers Network, which works primarily in the pharmaceutical/healthcare and office furniture<sup>23</sup> sectors
- 3) The Clinton Foundation, whose Large Cities Leadership Group, assembled in August 2006, aims to pool the purchasing power of participating cities, which include Chicago, São Paulo, Rome, Toronto, Delhi, Istanbul, Johannesburg, London, and many others

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<sup>23</sup> *The U.S. EPA Green Suppliers Network includes leading Midwest furniture manufacturers – Haworth, Inc., Herman Miller, Inc., HNI Corp., Kimball International, Inc., Light Corp., and Steelcase Inc. – and leading pharmaceutical/healthcare companies, such as Baxter International and Abbott Laboratories.*



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## Energy Efficiency and Conservation

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**E**nergy efficiency and conservation represent the least expensive Socolow wedges and present the smallest barriers to overcome. The ELPC's initiative *Repowering the Midwest – The Clean Energy Development Plan for the Heartland* shows that the Midwest could flatten energy demand through 2020 by implementing highly cost-effective, modern energy efficiency technologies that cost 2.5 cents or less per KWh. This is less expensive than generating, transmitting, and distributing power by almost any other means.<sup>24</sup> These findings have been replicated in numerous reports. According to a November 2006 study by the McKinsey Global Institute, the growth rate of worldwide energy consumption could be cut by more than half over the next 15 years through more aggressive energy efficiency efforts using existing technology: adopting compact fluorescent light bulbs, improving insulation in new buildings, reducing standby power requirements, pushing for appliance efficiency standards, and using solar water heaters.<sup>25</sup>

The cost to the Midwest economy of missed energy efficiency investment opportunities is high. For example, the Midwest depends on imported natural gas supplies for industrial production and space heating. According to a 2005 report by the American Council for an Energy Efficient Economy (ACEEE), more than \$40 billion was expected to be diverted from the Midwest economy to pay for imports in 2006. ACEEE concluded that a moderately aggressive energy efficiency program, resulting in a reduction of natural gas consumption by 1% per year for five years, could produce a decrease in wholesale natural gas prices of 13%, drastically lower gas and electricity bills, and create more than 30,000 new jobs.<sup>26</sup>

Despite its many advantages, energy efficiency as a means of reducing GHG emissions has largely been ignored in the Midwest. This is a wedge where new and stronger efforts are necessary to exploit the opportunity.

### ***Near-Term Opportunity: Expand Rate-Payer Funding for Energy Efficiency***

The value of funding energy efficiency measures is hard to overstate. For example, there are roughly seven billion incandescent bulbs in use in the U.S. One-fourth of a Socolow wedge could be achieved simply by replacing about 500 million of them annually with currently available compact fluorescents.

Nevertheless, only a few Midwest states have set aside significant investment dollars to promote energy efficiency. In 2003, Midwest states invested roughly \$230 million in gas and electric energy efficiency. In 2006, the number rose to \$316 million. Iowa at \$88 million, Minnesota at \$91 million, and Wisconsin at \$62 million (increasing to \$85 million in 2007) account for more than 75% of the total and much of the increase. These are states where a mechanism is in place to make energy efficiency investments. Illinois,

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<sup>24</sup> For details see ELPC's Website [www.repowermidwest.org](http://www.repowermidwest.org).

<sup>25</sup> Steve Lohr, "Energy Use Can Be Cut by Efficiency, Survey Says," *nytimes.com*, Nov. 29, 2006.

<sup>26</sup> Martin Kushler, Dan York, and Patti Witte, "Examining the Potential for Energy Efficiency to Help Address the Natural Gas Crisis in the Midwest," ACEEE, Jan. 2005.

Michigan, and Ohio – states where there has been deregulation of power markets – made more modest investments. Indiana invested less than \$1 million.<sup>27</sup>

With growing concern about energy prices, expanding rate payer funding for energy efficiency has a high public value. Broader public support would stimulate progress in all states. Every state and locality needs to address barriers to energy efficient actions that serve its residents. Increasingly, investors are taking best practices in energy efficiency and green building design into account. This adds another incentive to place energy efficiency on the fast track it deserves.

***Near-Term Opportunity: Best Practices in Energy Efficiency Standards and Codes***

One Socolow wedge could come from mandating best energy efficiency practices in all new and existing commercial buildings in the U.S. by 2055, using current technology. Another wedge could be achieved by imposing best practices on all residential structures. The largest carbon savings would derive from efficient space heating and cooling, water heating, lighting, and electric appliances. Progress toward best practice through energy efficient building codes, appliance standards, and public benefit funds may come in the 2007 state legislative sessions.

The Midwest Natural Gas Initiative, a cooperative effort by eight Midwest states<sup>28</sup> to develop a regional plan for energy efficiency, has lost some momentum due to falling natural gas prices, but it remains a promising effort. The initiative, facilitated by the Midwest Energy Efficiency Alliance (MEEA), aims for a 1% per year reduction in natural gas consumption for five years. Until now, only Iowa and Wisconsin have signed off. Prior to the 2006 elections, it was difficult to get additional states to sign binding agreements.

***Near-Term Opportunity: Joint Purchasing Initiatives for Energy Efficiency***

Utilities have expressed interest in the recent National Action Plan for Energy Efficiency, formulated in July 2006. Corporate supporters of the plan include Wal-Mart, Eastman Kodak, Food Lion, and Duke Energy, whose president co-led the planning process and who has renewed Duke's commitment to energy efficiency in Ohio and Indiana. This new level of business commitment presents an opportunity for joint purchases and solicitation of additional public commitments.

A number of intermediaries are ready to help with joint purchases of energy efficient products (see "Renewable Electricity and Fuels" section). These intermediaries include MEEA, which already has incentive campaigns; the EPA's Green Suppliers Network, which works mainly in the pharmaceutical/healthcare and office furniture sectors; and the Clinton Foundation, which formed the Large Cities Leadership Group to facilitate joint purchasing.

***Mid-Term Opportunity: Investment in Public Building Energy Efficiency***

Public buildings, including hospitals, schools, libraries, prisons, and colleges, account for

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<sup>27</sup> Wendy Jaehn, "Welcome to My World: Changes in Policy, Programs and Budgets in the Midwest," *Midwest Energy Efficiency Alliance, 2006 National Symposium on Market Transformation, ACEEE and CEE*.

<sup>28</sup> Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin.

20% of the power market. Although the return on energy efficiency investment in these buildings is excellent, it is hard for governments to pull together the capital required to make these improvements.

Ann Arbor's eight-year-old Municipal Energy Fund offers a model. The fund provides capital for energy efficiency retrofits of public buildings and in return receives 80% of projected annual energy savings from each installed project for five years. The fund was seeded by the city with five annual investments of \$100,000, but quickly became self-sustaining.<sup>29</sup>

Cities and states in the Midwest could create similar funds by issuing bonds, with repayment based on the payback in energy savings. It would be extremely helpful if the private sector could create a new investment vehicle, such as a shared savings investment pool, for energy efficiency retrofits. Financial institutions active in the Midwest that have the capacity to develop this kind of product include ABN AMRO, Goldman Sachs, JPMorganChase, and Wells Fargo.

Further leadership in promoting energy efficiency and renewable energy for public institutions may emerge from the top land-grant universities of the Midwest. A group of colleges and universities is collaborating with the Wege Foundation to share information about "economicology," where economics and ecology issues meet. Their forum, active on campuses and in communities, includes Michigan's public universities, Yale University, and the University of California at Santa Barbara. At the University of Wisconsin, President Kevin Reilly has signed Wisconsin's "Declaration of Energy Independence" committing three campuses to producing enough of their own energy to be completely energy independent within five years. University-based energy efficiency projects save money and model behavior for students.

### ***Mid-Term Opportunity: Decouple Utility Sales and Profits***

Because only modest sums are spent on energy efficiency education and incentives, Midwest companies and households continue to pass up investments that would yield paybacks in a year or two. California, which systematically invested in energy efficiency, has shown that high returns are achievable. Per-capita electricity consumption in California has stabilized, while it has rapidly risen in the rest of the U.S.

The lack of incentives for utilities is a major barrier to promoting efficiency. In states that have not deregulated, regulated utilities are paid for selling electricity. Energy efficiency is not in their interest because it causes sales to diminish. "Decoupling" utility sales and profits would allow regulated utilities to increase rates if they helped customers cut energy use.

In deregulated states, adoption of "loading orders" could unleash investment in energy efficiency. Loading orders are requirements that utilities resort to energy efficiency measures first, then tap renewable energy sources. Only after those options prove inadequate are they allowed to buy power or build a new generation plant.

Wisconsin utilities already operate under such loading orders. Iowa has Integrated Resource Planning, which requires evaluating the least-cost mix of utility resource options; energy efficiency is usually the lowest cost. MEEA is working to educate other Midwest states in encouraging utilities to promote energy efficiency, and Minnesota, Iowa, and

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<sup>29</sup> *International Council for Local Environmental Initiatives, Cities in Action, 2006.*

Ohio are exploring decoupling. Ohio and Minnesota present significant potential for relatively rapid progress on energy efficiency incentives.

***Mid-Term Opportunity: Promote Energy Efficiency through ISOs***

Regional systems for reliable energy transmission (including Midwest Independent System Operator and PJM) also offer opportunities to promote energy efficiency. Because energy efficiency contributes to both energy security and reliability, Independent Transmission System Operators (ISOs) should arguably play a role in promoting energy efficiency. To figure out the right mechanisms and incentives, we need a better understanding of the Midwest energy system and potential institutional levers.

***Mid-Term Opportunity: Carbon Performance Standards***

In 2006, California adopted a carbon performance standard for power plants. All new plants must emit no more CO<sub>2</sub> than a natural gas-fired combined cycle plant, which typically emits roughly half the CO<sub>2</sub> emitted by a conventional plant. The legislation, signed last fall, also applies to out-of-state power purchases, thus imposing standards on plants in other states that hope to sell their power in California. In 2007, California will start debate on setting a motor fuel standard as well. In the Midwest, only Minnesota seems poised to impose a carbon performance standard in 2007.

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# Transportation Efficiency and Conservation

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**T**ransportation is the fastest growing source of GHG emissions. According to the Pew Center on Global Climate Change, the transportation sector – mainly cars and light trucks – produced 27% of America’s GHG emissions in 2000.<sup>30</sup> Despite this evidence, policymakers are reluctant to press for the manufacture of higher efficiency vehicles other than by purchasing such vehicles for their own fleets.

That reluctance stems from a desire to preserve the ailing U.S. auto industry, and it carries so far that transportation energy efficiency and demand reduction are entirely absent from many climate action agendas. With the region home to so much truck, train, and air traffic, the Midwest has a large stake in controlling transportation-related emissions.

## ***Near-Term Opportunity: Clean Car and Fuel Economy Standards in Illinois***

While there is considerable Midwest support for biofuels, enthusiasm for tougher emissions standards or higher fuel economy standards is low. Many auto industry analysts believe these standards are needed to drive technological innovation. While it seems a big step to achieve one Socolow wedge by doubling the fuel efficiency of cars, recent history suggests it is quite possible: the efficiency of new passenger cars in the U.S. doubled between 1974 and 1985.<sup>31</sup>

California-level clean car standards may be politically achievable in Illinois, paving the way to advance these standards in other auto industry states. Gov. Blagojevich has formed a Clean Cars working group to develop legislative proposals. Mayors could be an important ally. The 15 Midwest mayors who participated in the U.S. Conference of Mayors National Summit on Energy and the Environment in May 2006 agreed to encourage automakers to make more energy efficient cars, including hybrids and plug-in hybrids.

A 2005 ELPC study found that if Midwest residents could travel the same distance using 25% less gas, they would save \$14.6 billion per year. That savings would translate into \$3.4 billion in additional economic activity in Illinois alone, potentially creating 21,000 net new jobs.

## ***Near-Term Opportunity: Purchasing Power for Fleets and Fueling***

All of the Midwest states are purchasing biofuel, flex-fuel, and efficient vehicles. Purchasing cleaner running and more efficient vehicles will reduce GHG emissions. However, the numbers are not at the level needed to achieve meaningful emissions reductions. Joint purchases could stimulate market development and lower prices. While there are examples of such efforts, they are few.

For example, the Chicago Metropolitan Mayor’s Caucus has pooled investment in alternative fueling stations. In 2000, the caucus established the Regional Alternative Fuel Infrastructure (RAFI) Program. RAFI made it possible for ten compressed natural gas

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<sup>30</sup> David L. Greene and Andrea Schafer, Reducing Greenhouse Gas Emissions from U.S. Transportation. Prepared for the Pew Center on Global Climate Change, May 2003.

<sup>31</sup> Pacala and Socolow, 2004.



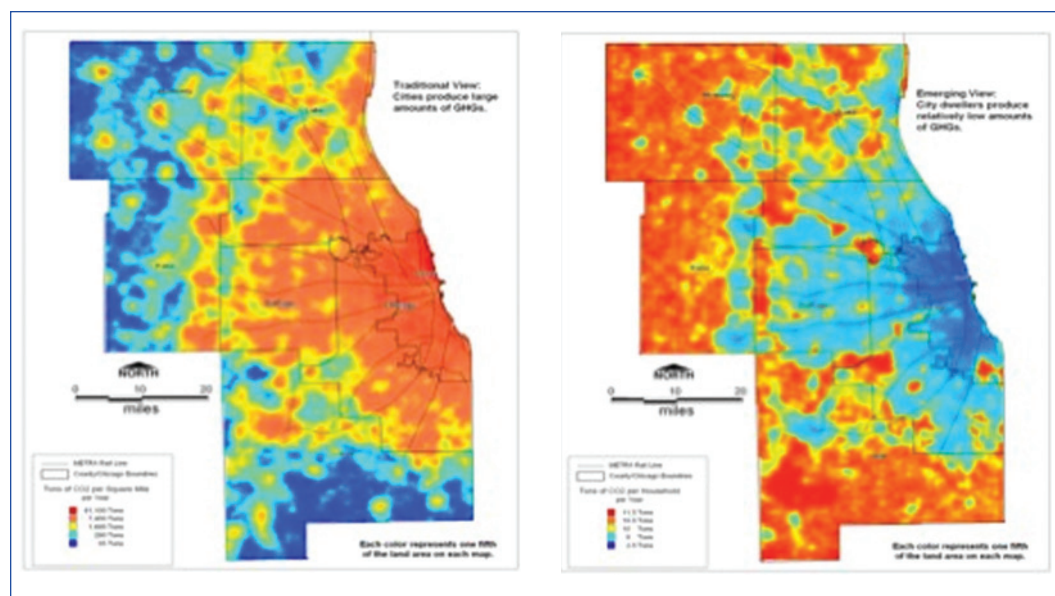
fueling stations to be installed throughout the Chicago area. These fueling stations have brought alternative fuels to 20 communities and more than 300 municipal vehicles.<sup>32</sup>

Plug-In Partners, an initiative to aggregate purchases, hopes to demonstrate to automakers that a market for flexible-fuel plug-in hybrid electric vehicles (PHEV) exists today. The cities of Austin and Los Angeles are working on a request for proposals for PHEV that other cities could join. Some Minnesota lawmakers hope that the production of plug-ins can revitalize Saint Paul's Ford Motor Co. plant.

### ***Near-Term Opportunity: Smart Growth and Transportation Demand***

In the last decade, transportation analysts and elected officials have gained a better understanding of the dynamics of travel demand. Income levels and business activities are poor predictors of why people travel, but land use and transportation system features are strong determinants. To have an enduring effect on emissions from transportation, the Midwest must improve land use patterns and transportation efficiency. This finding, supported by ample research, is missing from the policy debate.

A Midwest Socolow wedge analysis could help clarify the importance of public transportation and changes in land use in mitigating climate change. The GIS maps below, produced by CNT, show that while the City of Chicago has higher GHG emissions (map on the left) than its suburbs, its more compact land usage produces lower transportation-related GHG emissions per household.



Regional GHG emissions from miles traveled can be reduced, but only if states, municipalities, and special service agencies work together to reduce sprawl, prioritize development in existing communities, and remove subsidies for developing outside the developed footprint.

Transportation and land use planners can ease the process by delineating the costs, energy intensity, and emissions impact of various transportation and development patterns.

<sup>32</sup> *Air Quality Protection and Improvement, Building Sustainable Communities, Northeastern Illinois Planning Commission and the Campaign for Sensible Growth, Volume 1, Jan. 2004.*

Because the overwhelming share of transportation emissions is from cars and trucks, the goal of public investment should be to give the maximum number of travelers other choices for travel – mass transit, car sharing, and vanpools among them.

Car sharing, a system in which members share access to a pool of cars, grows in popularity as more people are informed of the costs of driving and ownership, and the alternative of sharing access to a fleet. Every car-sharing car is estimated to take ten cars off the road.<sup>33</sup> Car sharing and many other creative initiatives for demand-side management of transportation have yet to be scored for their GHG emissions reduction benefits.

Controlling GHG emissions from freight is more difficult because of the current inefficiency in shipping and manufacturing networks. Locating producers and suppliers closer together would reduce travel demand. Reducing the time that freight trains spend idling while waiting for a chance to unload their cargo is a good place to begin. The Chicago Regional Environmental and Transportation Efficiency project (CREATE), formed to pursue major improvements in the freight transportation system, may emerge as an important regional emissions driver. Without improvements to the freight infrastructure, the mounting delays in rail traffic will shift cargo to trucks and highways. CREATE represents the first time the railroad industry and government have worked together on a capital project, but the project is greatly under-funded.

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<sup>33</sup> *I-GO Car Sharing and Center for Neighborhood Technology, 2006.*



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## Clean Coal

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In the Midwest, coal is a major source of fuel for energy generation and a major source of carbon emissions. Projected increases in Midwest electrical demand are as high as 2% per year throughout the next 25 years. These projections are driving proposals to construct dozens of new coal-fired generation plants. All of the coal-producing states are seeing a surge in interest in building pulverized coal plants that are large GHG emitters.

One of the lowest-cost approaches for achieving a Socolow wedge is to reduce this reliance on coal. Replacing 1,400 one-gigawatt coal plants with natural gas electric plants would achieve a wedge. A second wedge could result from displacing coal used for industrial purposes or home heating. A wedge also might be achieved by moving entirely to a clean coal system, embracing IGCC technology and sequestration as our regional standard.

Socolow points out that not all wedges are created equal. Some have more lasting impact than others. It is more important to make the right investment choices when the investment has a long life, as is the case with new coal-fired power plants.

### ***Near-Term Opportunity: Demonstrate the Financial Risks of Pulverized Coal Plants***

Bankers, insurers, institutional investors, and rating agencies are increasingly aware of the financial risks posed by climate change. They also are beginning to recognize that companies must manage the risk of future regulation of carbon.

JPMorganChase & Co. is working with analysts and bankers to model the impact of carbon on the bank's clients. Carbon disclosure and mitigation efforts are now a formal part of the bank's loan-review process. ABN AMRO signed on to Equator Principles, committing to screen investments for impact on environment and climate. Wells Fargo is integrating a formal process for environmental due diligence in its business practices and procedures. Goldman Sachs has adopted a comprehensive environmental policy that acknowledges the value of "ecosystem services" and carbon savings. The firm's analysis of power plants, for example, quantifies GHG emissions and factors in their cost.

Perhaps the strongest evidence of the financial risk of construction pulverized coal plants was reflected in the terms for the Texas Pacific-KKR buyout of TXU. TXU's plans to construct 11 new pulverized plants were running into powerful opposition, and in the buyout agreement that had the support of several environmental groups, Texas Pacific and KKR agreed to reduce the number of proposed new plants from 11 to 3. This is evidence that investor and regulator concern over risk of regulation can push energy companies to switch some of the billions of dollars in planned investments in coal-fired power plants to cleaner facilities.

The Illinois State Treasurer has joined other state treasurers and controllers from around the country to urge insurance companies to analyze and disclose their financial risk from climate change. The Illinois State Treasurer is part of the Investor Network on Climate Risk, which Ceres manages. Ceres, a national coalition of institutional investors and environmental organizations, held an investor conference on climate risk in Decem-

ber 2006. This could kick off a sustained engagement of Midwest investors in coal-fired power plants.

***Near-Term Opportunity: Reduce Pollution from Existing Coal-Fired Power Plants***

Springfield, Illinois, recently reached an agreement with the Illinois Sierra Club to replace an old, municipally-owned, coal-fired power plant with a state-of-the-art plant, and to add wind energy. The State of Illinois reached agreement with the operator of six coal-fired power plants in northern and central Illinois to cut mercury emissions, which may lead to the closure of several older plants. The Mayor of Minneapolis and multiple environmental groups reached a settlement with Xcel Energy to convert two metro-area Xcel Energy coal plants to natural gas. The Riverside Coal Plant, the single largest source of pollution in Minneapolis, will be converted to natural gas by 2009. And AEP has announced that it will add carbon sequestration capacity to two of its existing plants.

The lessons learned in these successful negotiations should be circulated to stakeholders in other Midwestern cities. Environmental advocacy organizations and networks, especially the members of the Renewable Energy Alignment Mapping Project (Re-AMP), can help identify the best opportunities to repeat these successes with coal-fired plants throughout the region.

***Mid-Term Opportunity: Address Barriers to IGCC with Carbon Sequestration***

New technologies to produce clean coal could ensure that coal will continue to play an economic role in the Midwest, even in a carbon-constrained economy. IGCC, an emerging power generation process, uses a gasifier to transform coal to a synthetic gas consisting mainly of carbon monoxide and hydrogen. The process, which requires the trapping, or sequestration, of resultant carbon dioxide gas, produces lower sulfur dioxide and mercury emissions than pulverized coal plants. While it promises a cost-effective method of controlling carbon dioxide emissions, the process is still 10 to 15 years away from being commercially viable. The AEP experience of adding carbon sequestration capacity to existing plants will be carefully monitored, and AEP is expecting federal support for its project.

The potential for a multi-stakeholder process to promote and accelerate development of IGCC gained momentum with the Joyce Foundation's recent grants to a variety of environmental organizations, labor groups, and the Great Plains Institute. The grantees will work with coal and utility executives, regulators, and social and environmental activists to promote alternatives to conventional coal technology, addressing technical, financial, and regulatory barriers to progress. For example, the Apollo Alliance, which has brought together labor unions to support a program for good jobs and clean energy, will build support among labor leaders in Wisconsin, Ohio, and other Midwest state for coal gasification as an alternative to conventional coal power plants.

Industry groups also are interested in exploring clean coal. Cinergy and AEP are working with General Electric and Bechtel Corp. to design and construct separate coal gasification 600-MW IGCC plants in Indiana and Ohio. JPMorganChase has formed a coalition with other financial institutions, the electric utility industry, climate policy experts in NGOs and universities, states, and the U.S. government to develop financing mechanisms for coal gasification with carbon sequestration.

Governments, too, are getting on board. Illinois Gov. Rod Blagojevich has formed

a working group to recommend a state coal gasification plan and has proposed a \$750 million package of financial and tax incentives for the development of ten coal gasification plants as well as long-term contracts to help prove the market. Indiana Gov. Mitch Daniels signed an executive order creating the Interagency Council on Energy to provide advice on energy options, including clean coal. State legislators throughout the region, members of the National Caucus of Environmental Legislators, have offered plans to encourage coal gasification and carbon sequestration.

The collaborative efforts now underway and long-term commitments to purchase power from IGCC plants could reduce the risks of building coal gasification plants and enhance the market for Midwest coal.

***Mid-Term Opportunity: Agreements for Long-Term IGCC Contracts***

If Midwest energy buyers could agree to long-term contracts to buy 25% of their energy from IGCC plants at a set price, they would create a market. However, 27 states (including Midwestern states Wisconsin, Minnesota, and the Dakotas) don't offer choice in electricity purchases, a barrier to progress that should be surmountable.

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## Terrestrial and Geological Sequestration

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**G**eologic sequestration captures carbon dioxide gas from power plants and other industrial facilities and injects it into geologic formations deep underground. One Socolow wedge could come from injecting one million tons of CO<sub>2</sub> underground per year by 2055. That is roughly the amount of CO<sub>2</sub> generated each year by 800 large coal-electric plants or 1,600 natural gas plants. Illinois and Indiana have large concentrations of limestone formations ideal for carbon sequestration.

Terrestrial sequestration of CO<sub>2</sub> involves transferring CO<sub>2</sub> from the atmosphere into soils and vegetation. This can be accomplished by a variety of methods, including reducing tillage intensity, diversifying crop rotations, reducing summer fallow, planting higher residue crops such as corn, grain sorghum and wheat, planting winter cover crops, selecting varieties and hybrids that store more carbon, converting marginal agricultural land to grassland or forest, restoring wetlands, and using vegetation buffers and conservation measures that reduce soil erosion.

One Socolow wedge could be achieved through conservation tillage on all soils worldwide – leaving crop residue on the surface and planting the next crop in that carbon enriched soil. In addition to reducing CO<sub>2</sub> emissions, conservation tillage improves water conservation and reduces soil erosion.

Halting global deforestation and doubling the current rate of forest planting could achieve another wedge. No-till farming could reduce emissions further. Soil loses most of its carbon content during plowing, which releases CO<sub>2</sub> into the atmosphere. In no-till agriculture, practiced on only 5% of the world's cropland, farmers plant seeds without using a plow to turn the soil. U.S. farmers use no-till methods on 37% of the nation's cropland, which keeps an estimated 60 million metric tons of CO<sub>2</sub> from being released into the atmosphere every year.

Assuming the development of carbon markets, terrestrial sequestration could provide a new source of revenue for Midwest farmers who sell carbon credits to governments and businesses seeking to reduce their GHG emissions. Delta Institute already is aggregating farmer practices that sequester carbon for credits at the Chicago Climate Exchange and brokering sales of these credits to companies.

The Midwest Carbon Sequestration Regional Partnership has identified many terrestrial sequestration options in the Midwest. These include deep geologic and saline formations, depleted gas formations, unmineable coal seams, and depleted reservoirs, in addition to more typical options such as eroded and prime cropland, marginal land, mine land, wetlands, and marsh lands. The Partnership's six pilot projects, now underway, are testing various terrestrial and geological sequestration options, part of a \$20 million research project. The partnership is made up of government (the states of Michigan, Indiana, and Ohio) and industry representatives (BP, American Electric Power, and Battelle Science and Technology International).

Other Midwest researchers are also studying geological and terrestrial sequestration possibilities. The DOE is supporting the Midwest Geological Sequestration Consortium to assess carbon capture, transportation, and storage processes, including their costs and viability, in the three-state Illinois Basin region. The Iowa Farm Bureau is supporting

terrestrial carbon sequestration research and development at Iowa State University and South Dakota State University. The Center for Neighborhood Technology created and is testing a green infrastructure valuation calculator based upon the hydrology of the Great Lakes. The calculator includes a rudimentary algorithm for calculating the GHG emissions reduction benefits of green infrastructure. Using this tool, CNT hopes to establish a standard measure of the carbon benefits of various green infrastructure investments.

Illinois, Indiana, and Ohio are participating in the efforts to help farmers receive carbon credits on the CCX for conservation practices that result in terrestrial sequestration. The Illinois EPA instituted the Illinois Conservation and Climate Initiative to award credits to farmers for conservation tillage, planting grasses and trees, and capturing methane from animal operations. After third-party verification of the offsets, these credits are sold to the CCX through the Delta Institute. Ohio agriculture officials are working with the CCX to aggregate reductions for credit. Sen. Richard Lugar's Indiana farm is the first in that state to enroll as an offset provider in the CCX for carbon sequestration benefits achieved through tree farm management practices.

***Near-Term Opportunity: A Coordinated Terrestrial Sequestration Initiative***

A learning and advocacy initiative to coordinate carbon sequestration efforts, aggregation mechanisms, and research and experimentation would benefit all of the Midwest states. It also would ensure that there is a Midwest voice articulating the importance of terrestrial sequestration in a federal cap and trade program and in the 2007 reauthorization of the Farm Bill.

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## Conclusions

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**T**he Midwest has much to lose through climate change inaction and much to gain if it seizes the initiative. Until now, the regional response has been relatively disorganized and muted. Yet awareness has grown of the serious environmental and economic consequences to the Midwest if climate change is allowed to proceed unchecked. While reducing GHG emissions will have its costs, the region also stands to benefit greatly. Renewable fuels, energy efficiency, and new coal technologies are potential sources of new jobs and economic development. Reducing reliance on imported fossil fuels, which at current prices costs the Midwest states \$100 billion every year, will keep potential investment dollars in the region. The region cannot afford to do nothing.

The many Midwest initiatives that could contribute to completing a Socolow wedge have been outlined in this report. A number of public officials who want to advance these initiatives are now in leadership positions as a result of the November 2006 elections. Still, it is far from clear that the scale and speed of reforms to come will be enough for the Midwest to contribute its share of emissions reductions and avoid the worst impacts of climate change. This is why it is critical to:

- Clarify the scale of action the Midwest needs to take to do its share to stabilize emissions.
- Update the assessment of the regional impact of failing to act.
- Ensure information sharing and broad-based collaboration on Midwest initiatives organized around each of the wedges.
- Support multi-stakeholder coalitions to work on policy at the state and federal levels to exploit opportunities in 2007 and beyond.

All of the wedge opportunities have gaps in research and development, and commercialization incentives also are lacking. The region's greatest opportunity lies in areas suffering from great neglect: energy efficiency, vehicle fuel economy, and transportation demand management. The top priorities, detailed in the body of this report, are to:

### **Document the Extent of the Climate Challenge in Clear and Precise Terms**

Foundations and government can step forward to fund the Midwest Socolow Wedge analysis, which WRI and other researchers are ready to complete. They also can fund research on regional climate impacts and support for local and state governments to plan for climate change, which organizations such as ICLEI and the Great Lakes and St. Lawrence Cities Initiative are prepared to commission.

### **Adopt Standards of Accounting for GHG Emissions Reductions and Offsets**

Companies and states can sign on now to the Multi-State Climate Registry. Environmental groups, government bodies, and CCX can come together now to clarify standards and additionality requirements for future carbon regulation and the role of CCX. All of the various entities reaching out to the public can come together to agree on measurement tools, recommendations for actions, and an infrastructure for helping the public to act.



### **Commit to State-Level Emissions Reductions**

All stakeholders can support or work toward state-level caps on GHG emissions and commitments by mayors to reduce emissions. The entire region must call on the leaders of governors' task forces in Illinois, Minnesota, and Wisconsin and city task forces in Chicago and other Midwest cities to recommend solutions at a scale that can address the challenge. Foundations, as even-handed conveners, can encourage cities and states to harmonize their efforts to leverage investment and align policies.

### **Support Federal Emissions Reductions**

Midwest business executives, elected officials, and other prominent leaders can speed the process of adoption of a federal climate policy by declaring their support for a national cap and trade system or carbon tax. When 65 large pension funds and companies recently asked Congress to pass legislation restricting carbon emissions, it was front page news.

While it appears that the idea of a cap and trade system is gaining support, the challenge is to define the standards and rules for the system. Whatever rules and standards are chosen are likely to serve the interests of one industry more than another. To the extent that Midwest stakeholders can reach an agreement about what these standards should be, they will have a greater chance of having these standards incorporated in federal policy and they will greatly facilitate the passage of federal legislation.

Midwest congressional leaders might find it easier to support climate change action if they had data on the costs to their districts of not acting to reduce GHG emissions and comparative information about the benefits that early action would bring.

### **Establish Renewable Energy and Fuel Standards**

Several Midwest states could enact strong state renewable portfolio and fuel standards in 2007 if there are broad coalitions in place and public support is forthcoming. If all of the Midwest states act, it also will be possible to work on the regional market for renewable energy certificates, making it easier to pass a national renewable portfolio standard. This will require business leadership and funding for NGOs to produce supporting analysis, such as impacts on jobs and economic development, and to organize public support.

The biggest opportunity to support renewable energy in the next two years is the reauthorization of the federal Farm Bill, which in many ways will be an energy bill. A stronger showing by energy, rural development, and conservation advocates such as 25x'25 and ELPC will determine how strongly the bill supports biofuels, cellulosic ethanol, rural wind and solar power, and biobased products.

While the rush today is to produce corn-based ethanol, CO<sub>2</sub> benefits will come mainly from cellulosic sources of ethanol. As pointed out at a recent national conference, an intense cooperative effort is needed to move the cellulosic industry forward and hasten the shift from corn-based ethanol. This can happen with funding support and leadership from the federal and state governments, industry, and the NGO community.

The desire to invest in the Midwest renewable energy sector is growing, but market barriers remain. Cities, states, and companies should be able to purchase and coordinate purchases of renewable energy and buy energy efficient products. WRI's Green Power Market Development Group and its Climate Midwest Partnership are helping to set up the systems to facilitate this work, as is the Clinton Foundation, whose Large Cities Leadership Group, assembled last August, aims to pool the purchasing power of partici-

pating cities. (Chicago is one of them.)

### **Encourage Energy Efficiency and Conservation**

Energy efficiency continues to be the biggest missed opportunity for achieving low-cost and easy-to-implement emissions reductions. Business and government support for energy efficiency investments and new building codes and standards for space heating and cooling, water heating, lighting, and appliances is not yet as strong as it needs to be.

As the Midwest states contemplate new energy plans in 2007, advocacy groups and the public should all join Iowa, Minnesota, and Wisconsin in aggressively investing in energy efficiency and in passing best practice building codes and standards. The 2007 state legislative sessions will provide a window for new commitments. Given the short payback on many energy efficiency investments, capital should not be a barrier. The World Resources Institute's Climate Partnership and the MEEA are helping companies that are prepared to provide leadership.

Public utility commissions and Independent Transmission System Operators (ISOs) in all Midwest states must do their part to promote energy efficiency. In states that have not deregulated, "decoupling" utility sales and profits would allow regulated utilities to increase rates if they help customers cut energy use. In deregulated states, adoption of loading orders could unleash investment in energy efficiency.

### **Increase Transportation Efficiency and Conservation**

California-level clean car standards may be politically achievable in Illinois, paving the way to advance these standards in other auto industry states. Groups such as the Apollo Alliance and ELPC are building support for these changes. States and cities that are purchasing biofuel, flex-fuel, and efficient vehicles deserve support. By pooling their purchasing power, governments could stimulate market development and lower prices.

Technology changes alone will not be sufficient to achieve the levels of GHG emissions reductions required to avoid dire impacts. Regional GHG emissions from miles traveled must be reduced, but it can only happen if states, municipalities, and special service agencies work together to reduce sprawl, promote transit and rail, and prioritize development in existing communities. Avoiding climate change has added to the already strong arguments of groups pursuing transportation reform and smart growth.

### **Eliminate Carbon Emissions from Coal Production**

The biggest threat to efforts to reduce GHG emissions is the planned construction of dozens of new coal-fired power plants. Environmental advocacy organizations and networks, especially the members of the Renewable Energy Alignment Mapping Project (Re-AMP), can help identify the best opportunities to repeat recent successes with closing high-polluting coal-fired plants.

Environmental groups, together with Midwestern investors and regulators who are concerned about risk, could help push energy companies to switch some of the billions of dollars in planned investments in coal-fired power plants to cleaner facilities. The recent decision of Texas Pacific and KKR to drop 8 of the 11 planned new TXU plants is a start. Equally important are the efforts of NGOs to work with coal and utility executives and regulators to promote alternatives to conventional coal technology.

### **Mobilize Support for Terrestrial and Geological Sequestration**

Various Midwestern research groups already are studying ways to use terrestrial and geological sequestration of carbon to reduce emissions. Coordinating carbon sequestration efforts, aggregation mechanisms, and research and experimentation would benefit all of the Midwest states.

A window of opportunity is open for the Midwest. Public awareness, political will, and corporate interest are higher than ever before. Those who don't find climate change arguments convincing can be persuaded to adopt the same measures to achieve energy security and economic prosperity. It will take a multi-stakeholder partnership of government, business, and the nonprofit sector to find the common ground and focus regional efforts in time to avoid devastating global impacts. To influence the course of climate change policy – and to be positioned to benefit from it – the Midwest must take its place at the table in the national discussion now.

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## Acronyms/Definitions

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BP	British Petroleum
CCX	Chicago Climate Exchange
CO <sub>2</sub>	carbon dioxide
CNT	Center for Neighborhood Technology
CREATE	Chicago Regional Environmental and Transportation Efficiency project
ELPC	Environmental Law and Policy Center of the Midwest
EPA	Environmental Protection Agency
GHG	greenhouse gas
GLSLCI	Great Lakes and St. Lawrence Cities Initiative
GW	Gigawatt: 1 billion watts or 1 million kilowatts
ICLEI	International Council for Local Environmental Initiatives
IGCC	Integrated gasification combined cycle
INCR	Investor Network on Climate Risk
ISO	Independent Transmission System Operator
KW	Kilowatt: a unit of electrical power equal to 1000 watts
KWh	Kilowatt Hour: the work performed by one kilowatt of electric power in one hour
MEEA	Midwest Energy Efficiency Alliance
MW	Megawatt: unit of electrical power equal to one million watts
NREL	National Renewable Energy Lab
RFA	Renewable Fuels Association
RGGI	Regional Greenhouse Gas Initiative
RPS	Renewable Portfolio Standards
UCS	Union of Concerned Scientists
WRI	World Resources Institute

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## Interviewees

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1. Michael Noble, Fresh Energy
2. Howard Learner, ELPC
3. Joe Shacter, ELPC
4. Scott Bernstein, CNT
5. Ann McCabe, Policy Solutions, consultant to UCS
6. Henry Henderson, Policy Solutions
7. Helen Howe, Exelon
8. Art Smith, NiSource
9. Bill Gerwing, BP America
10. Rebecca Stanfield, Environment Illinois
11. Peter Goldmark, ED
12. Steve Brick, The Joyce Foundation
13. Margaret O'Dell, The Joyce Foundation
14. Nancy Cole, UCS
15. Jennifer Layke and Andrew Aulisi, WRI
16. David Gard, MEC
17. Abby Young, ICLEI
18. Rebecca Wigg, MEEA
19. David Ullrich, Great Lakes and St. Lawrence Cities Initiative
20. Katie Nakola, Clean Wisconsin
21. Adam Schafer, National Caucus of Environmental Legislators
22. David Rankin, GLPF
23. Rob Johnson, Cargill
24. Julie Hamos, Illinois Representative
25. William Moomaw, Center for International Environment and Resource Policy,  
Tufts University
26. Sadhu Johnson and Karen Hobbs, Chicago Department of Environment
27. Ernie Shea, 25x'25
28. Ron Meissen, Baxter Healthcare Corporation
29. Tim Brown, Delta Institute
30. Bob Lieberman, Illinois Commerce Commission
31. John Cleveland, IRN, Inc.
32. Judy Greenwald, Pew Center on Global Climate Change
33. Ben Paulos, the Energy Foundation
34. Jane Krentz, former Minnesota State Senator
35. Bill Holland, the Apollo Alliance



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Global Philanthropy Partnership was founded in 2003 as a non-profit organization. While not a grantmaking organization, GPP serves as a strategic resource to promote international giving and raise awareness of global development issues.

Global philanthropy, or global social investing, is an emerging field with numerous players and a variety of approaches. Global Philanthropy Partnership strives to support a better understanding of this field through conducting original research, developing a network of organizations that promote philanthropy, and connecting philanthropists and potential philanthropists so they can share interests and best practices. Its current areas of interest also include climate change in the Midwest and environment projects in Panama.