

# Coal Data at the ISGS

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# Part B: Applications of ISGS

## Spatial and Relational Coal Data

## Recent applications:

- 1) Mined-Out Area Mapping
- 2) Coalbed Methane development potential
- 3) MIDCARB project
- 4) Coal Availability Studies

# Applications of Spatial & Relational Data: MIDCARB

## MIDCARB

Midcontinent Interactive Digital Carbon Atlas and Relational dataBase

- Funded by U.S. Department of Energy -  
National Energy Technology Laboratory (NETL)
- Joint project between five State Geological Surveys
  - 1) Illinois
  - 2) Indiana
  - 3) Kansas
  - 4) Kentucky
  - 5) Ohio



# Applications of Spatial & Relational Data: MIDCARB

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## Purpose

- Enable evaluation of geologic carbon sequestration potential
- Display and link the states' digital spatial and relational databases through an interactive map service (IMS)
- Estimate the amount of CO<sub>2</sub> emitted by source supplies with respect to potential geologic reservoirs
- Regionally characterize reservoirs:
  - Quality, size, and geologic integrity for:
    - CO<sub>2</sub> storage
    - Enhanced hydrocarbon recovery

# Applications of Spatial & Relational Data: MIDCARB

## Overall Plan

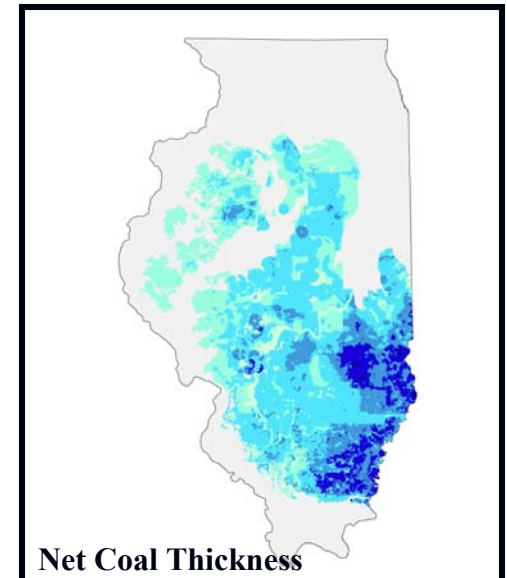
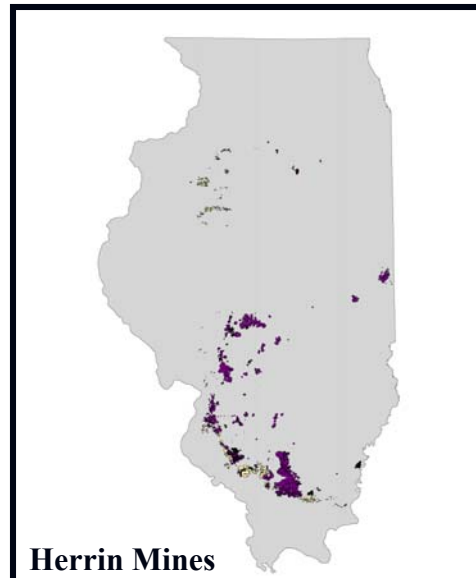
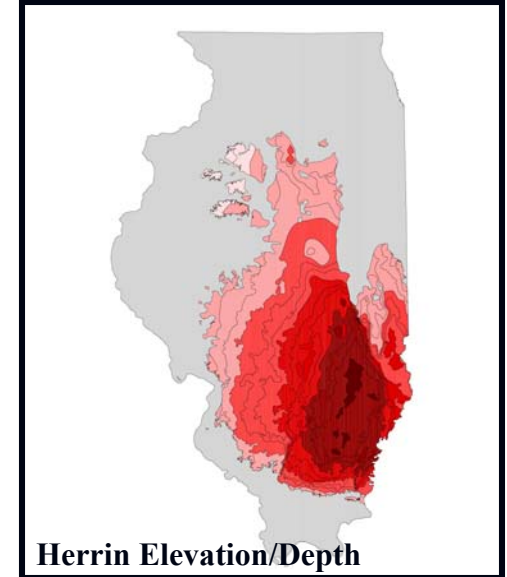
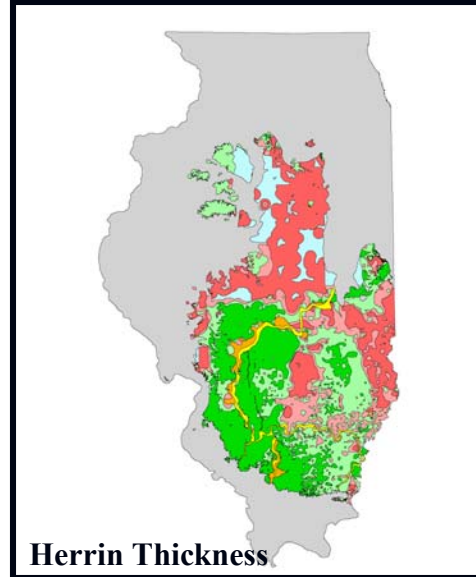
For each state:

- Identification of large stationary sources of CO<sub>2</sub>
- Compilation of emissions data from best available data sources
- GIS compilation of potential CO<sub>2</sub> sequestration target layers, and related data

# Applications of Spatial & Relational Data: MIDCARB

## Layers and Data Used

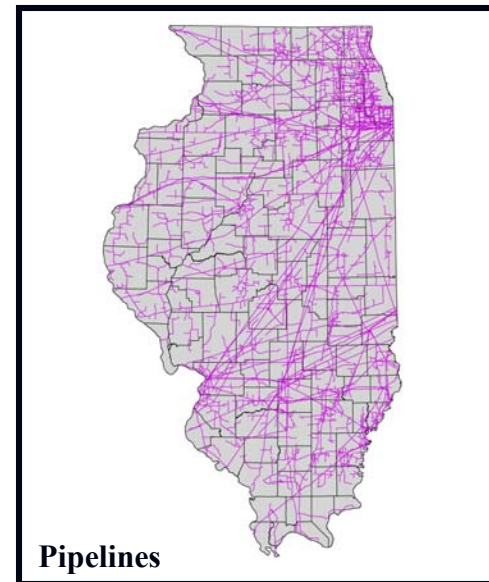
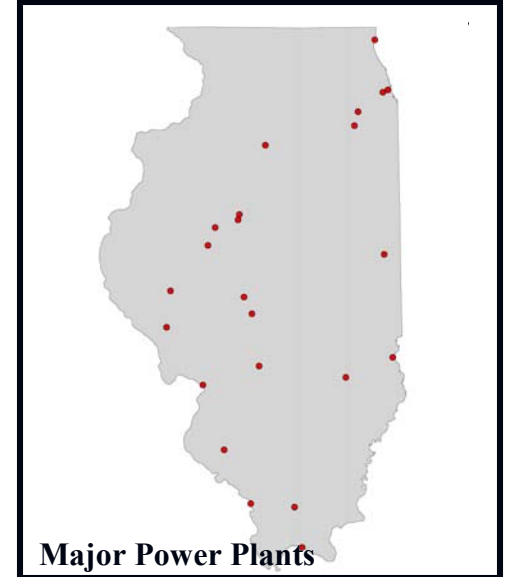
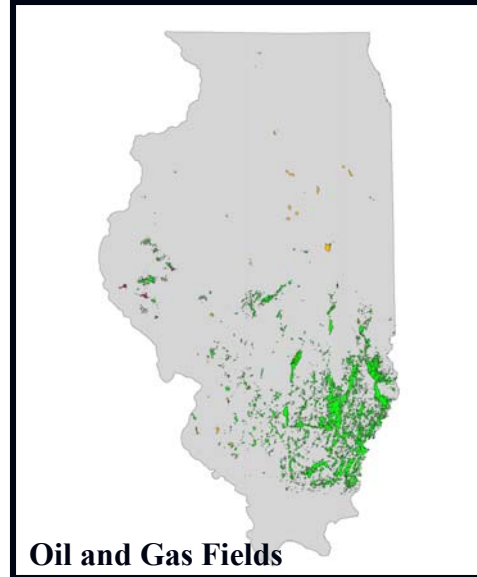
- Thickness
- Elevation/depth
- Mines
- Net coal thickness



# Applications of Spatial & Relational Data: MIDCARB

## Layers and Data Used

- Other Geologic Layers
  - Oil and gas fields
  - Saline aquifers
- Point-source CO<sub>2</sub> locations
- Infrastructure & basemap



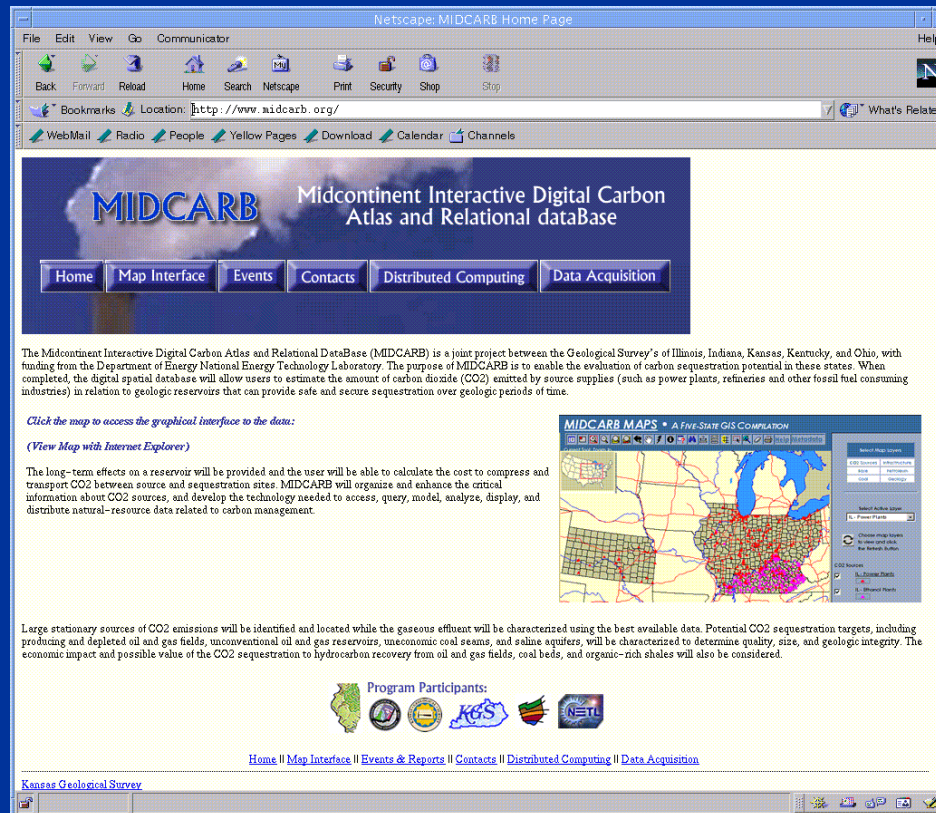


# Applications of Spatial & Relational Data: MIDCARB

## Products

Interactive Map Service ([www.midcarb.org](http://www.midcarb.org))

Link of digital spatial and tabular data from 5 Surveys as one product!



# Applications of Spatial & Relational Data: MIDCARB

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## Implementation

Agreed that each state would use:

- Oracle or SQL/Server for relational databases
- ArcSDE (Spatial Data Engine) for spatial layers
- server to provide this data over the internet

At least one instance of ArcIMS, for initial MIDCARB website

# Applications of Spatial & Relational Data: MIDCARB

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## Implementation, issues (simplified!):

- Common data format across 5 states
- Data availability via internet
- Website updates and development

# Applications of Spatial & Relational Data: MIDCARB

**MIDCARB** Midcontinent Interactive Digital Carbon Atlas and Relational DataBase

Home  
Contacts  
Distributed Computing  
Reports  
Meetings/Events  
Data Acquisition  
Data Analysis

MIDCARB is a project that will build a digital spatial database for five states that will allow users to identify the amount of CO<sub>2</sub> available for sequestration in relation to a source supply, the geologic security and safety of a sequestration site, the long-term effects on a reservoir, and the cost of compression and transport of CO<sub>2</sub> between source and sequestration site.

**NEW** February 28, 2002  
We have rewritten our map interface. Click on the image below to launch the new version. Use the "Display Data" button to access to power plant emissions data.

MIDCARB will organize and enhance the critical information about CO<sub>2</sub> sources, and develop the technology needed to access, query, model, analyze, display, and distribute natural-resource data related to carbon management.

--- [More About MIDCARB](#) ---

Upcoming Events			
Participating State Geological Surveys <a href="#">Indiana</a> <a href="#">Illinois</a> <a href="#">Kansas</a> <a href="#">Kentucky</a> <a href="#">Ohio</a>	March 10-12, 2002	<a href="#">AAPG Annual Meeting</a> <a href="#">EMD/DEG New Developments in CO<sub>2</sub> Sequestration</a>	Houston, Texas
	Thursday April 4, 2002, 8:00-12:00, West Room, Heritage Hall	North-Central and Southeastern <a href="#">Combined Section Meeting</a> of the Geological Society of America: Theme Session 2 - Geologic Sequestration of CO <sub>2</sub> . Jim Drahovzal, Kentucky Geological Survey and Larry Wickstrom, Ohio Geological Survey, co-conveners.	Lexington, Kentucky

## Website development, IMS updates

**MIDCARB** Midcontinent Interactive Digital Carbon Atlas and Relational DataBase

Home Map Interface Events Contacts Distributed Computing Data Acquisition

The Midcontinent Interactive Digital Carbon Atlas and Relational DataBase (MIDCARB) is a joint project between the Geological Survey's of Illinois, Indiana, Kansas, Kentucky, and Ohio, with funding from the Department of Energy National Energy Technology Laboratory. The purpose of MIDCARB is to enable the evaluation of carbon sequestration potential in these states. When completed, the digital spatial database will allow users to estimate the amount of carbon dioxide (CO<sub>2</sub>) emitted by source supplies (such as power plants, refineries and other fossil fuel consuming industries) in relation to geologic reservoirs that can provide safe and secure sequestration over geologic periods of time.

*Click the map to access the graphical interface to the data:*

*(View Map with Internet Explorer)*

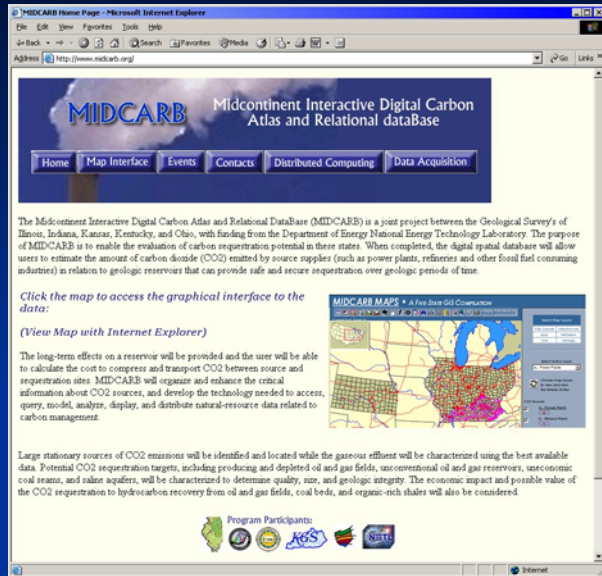
The long-term effects on a reservoir will be provided and the user will be able to calculate the cost to compress and transport CO<sub>2</sub> between source and sequestration sites. MIDCARB will organize and enhance the critical information about CO<sub>2</sub> sources, and develop the technology needed to access, query, model, analyze, display, and distribute natural-resource data related to carbon management.

Large stationary sources of CO<sub>2</sub> emissions will be identified and located while the gaseous effluent will be characterized using the best available data. Potential CO<sub>2</sub> sequestration targets, including producing and depleted oil and gas fields, unconventional oil and gas reservoirs, uneconomic coal seams, and saline aquifers, will be characterized to determine quality, size, and geologic integrity. The economic impact and possible value of the CO<sub>2</sub> sequestration to hydrocarbon recovery from oil and gas fields, coal beds, and organic-rich shales will also be considered.

Program Participants:

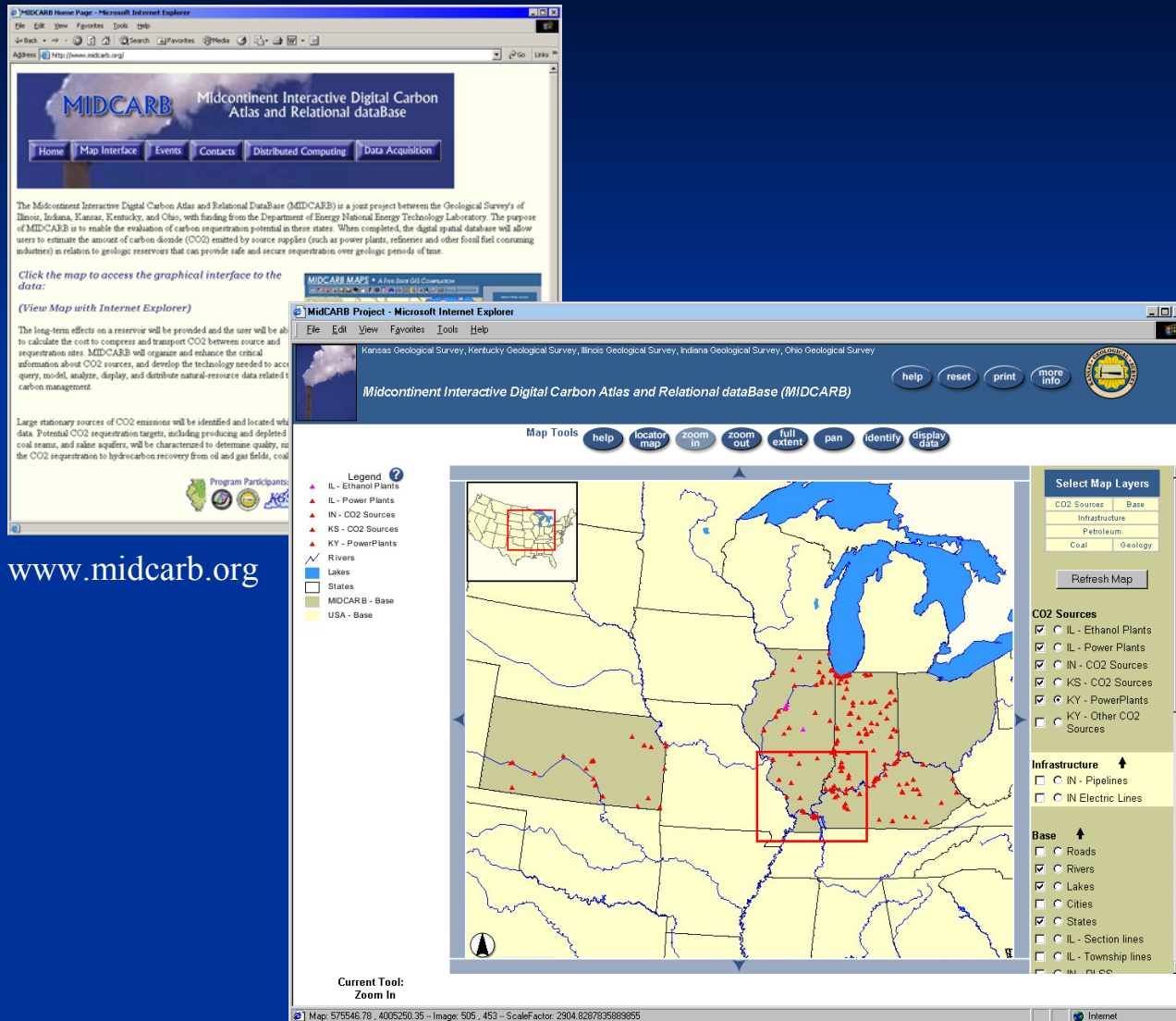
# Applications of Spatial & Relational Data: MIDCARB

## Brief example of the IMS



[www.midcarb.org](http://www.midcarb.org)

# Applications of Spatial & Relational Data: MIDCARB

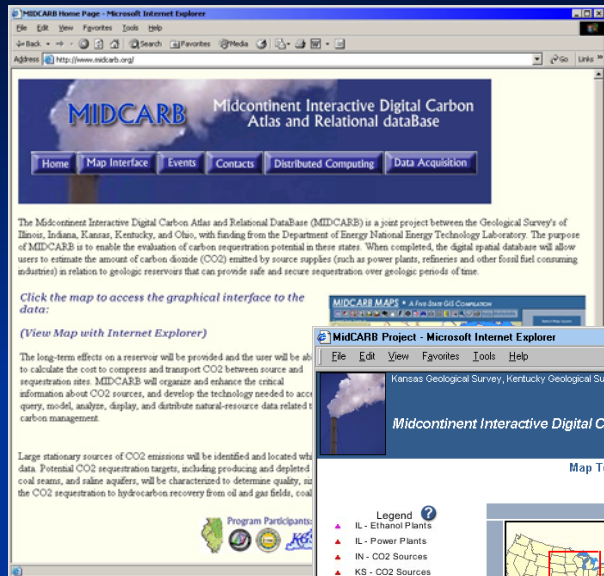


[www.midcarb.org](http://www.midcarb.org)

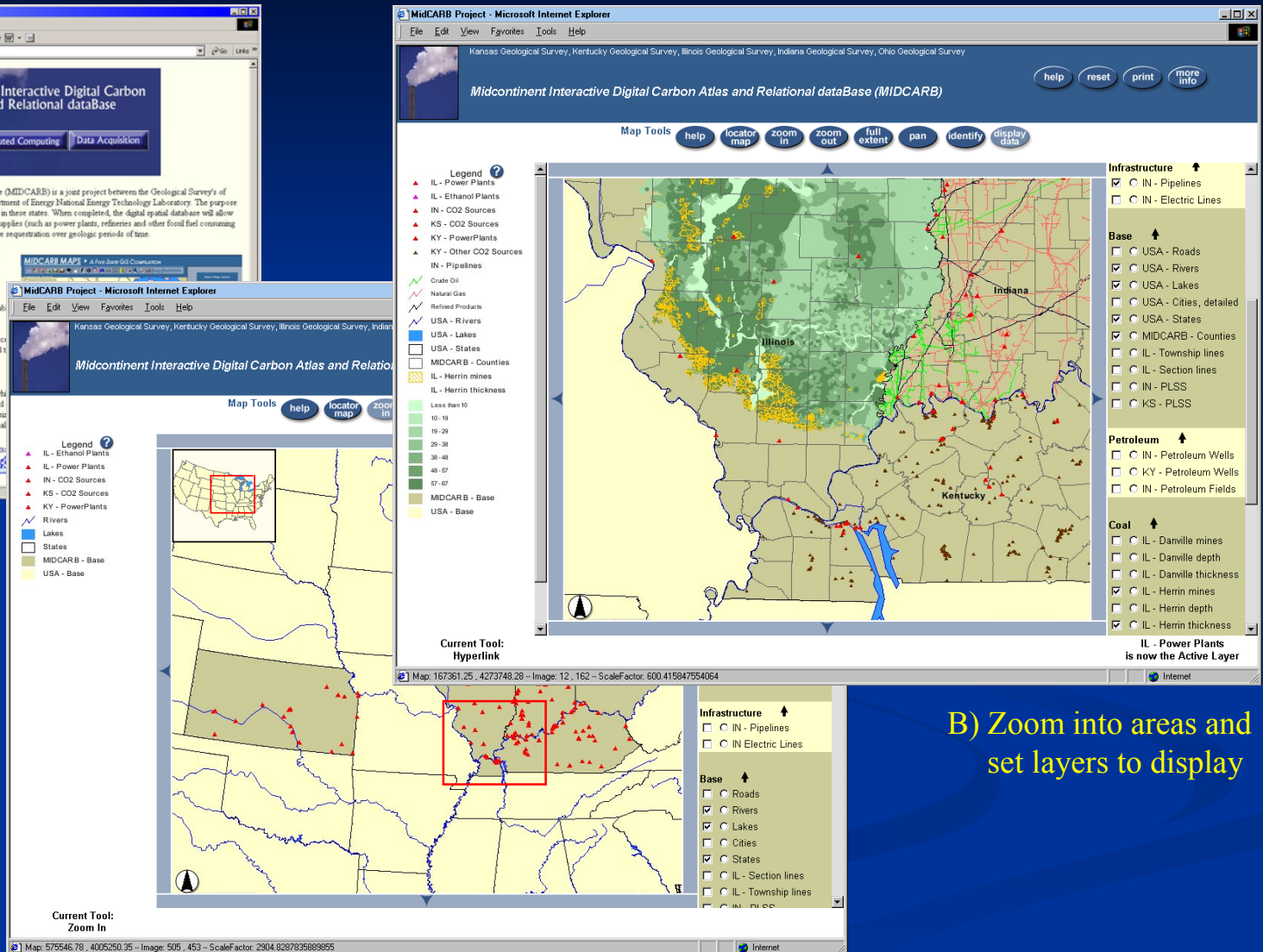
A) Launch the internet map service (newer version available)



# Applications of Spatial & Relational Data: MIDCARB



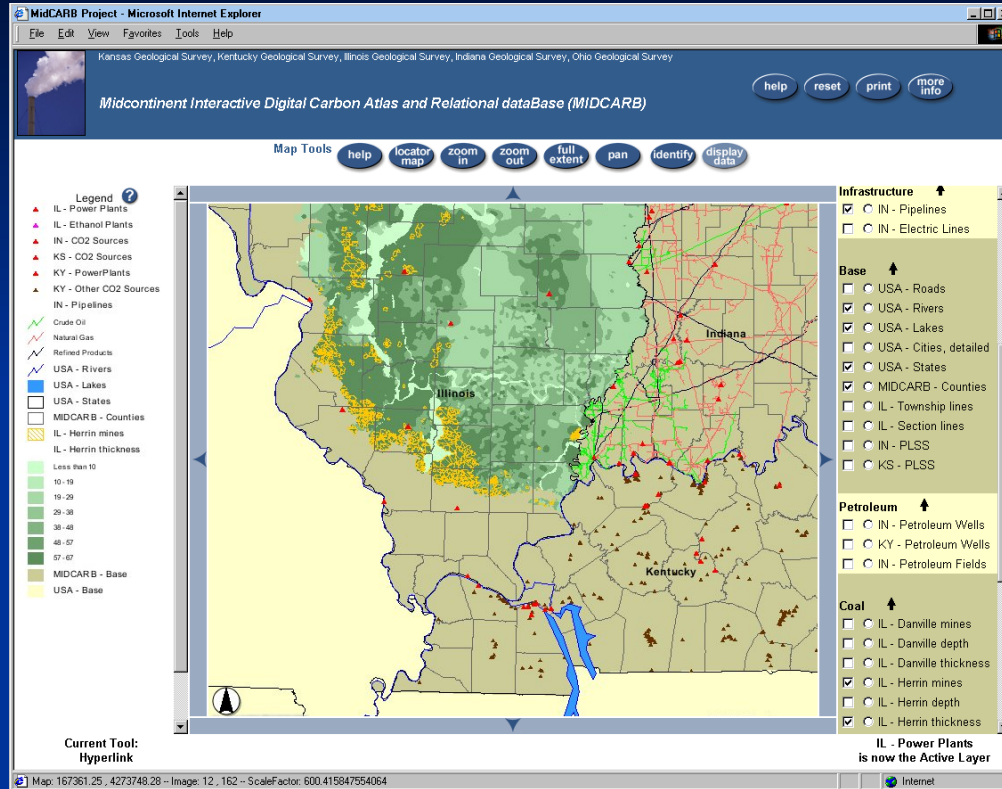
www.midcarb.org



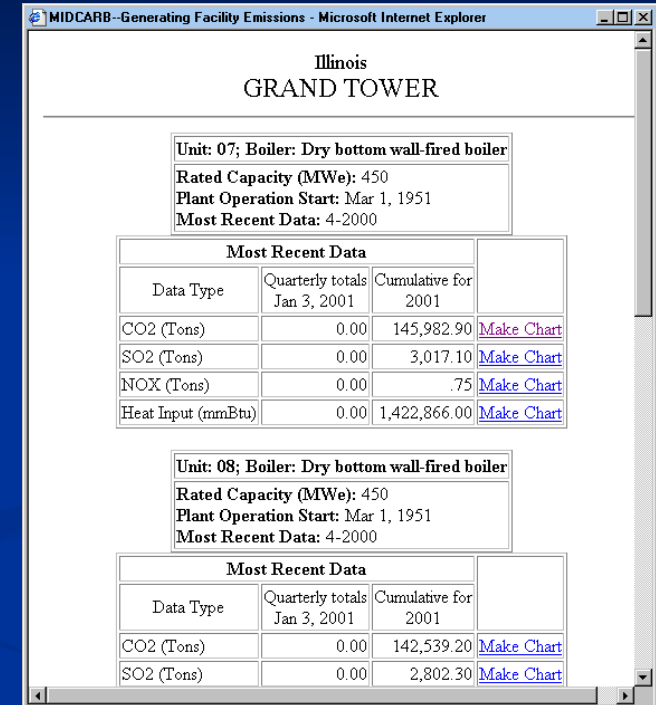
A) Launch the internet map service

B) Zoom into areas and set layers to display

# Applications of Spatial & Relational Data: MIDCARB



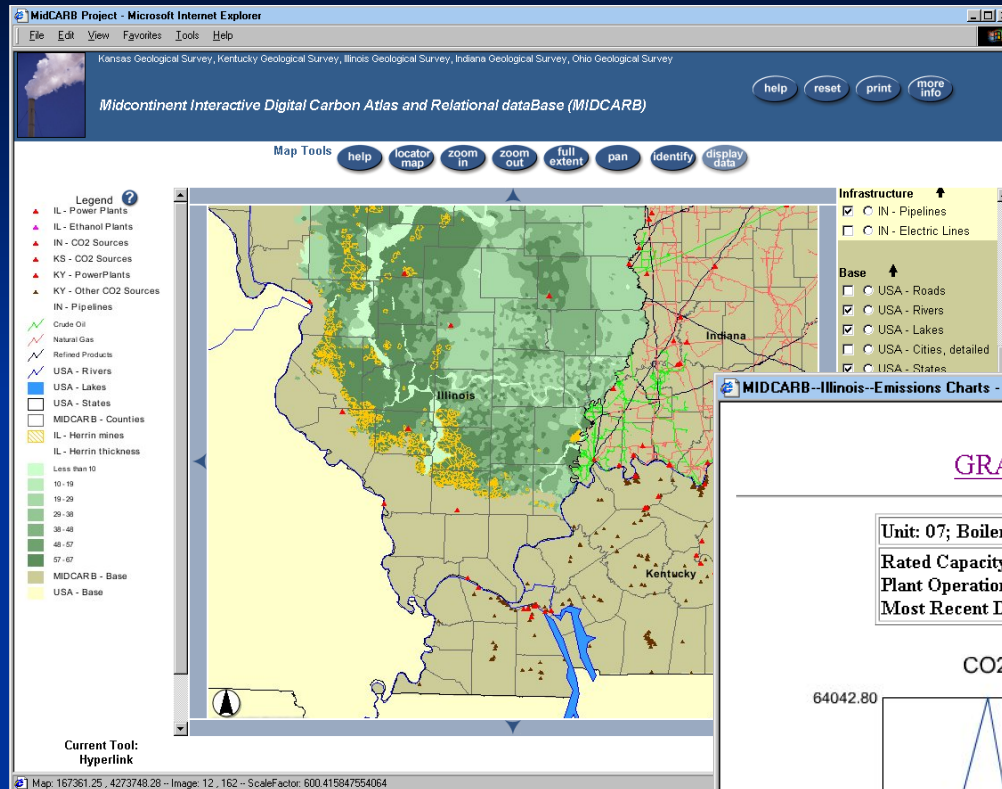
B) Zoom into areas and set layers to display



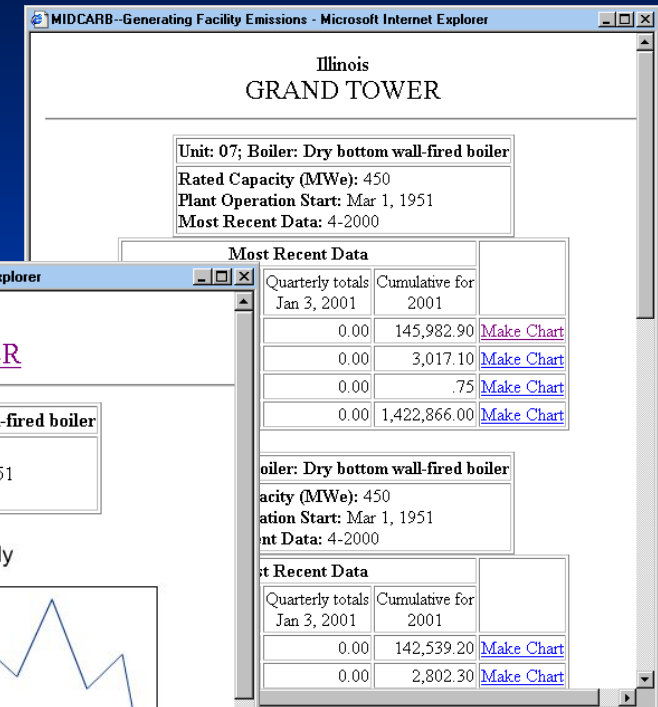
C) Query database



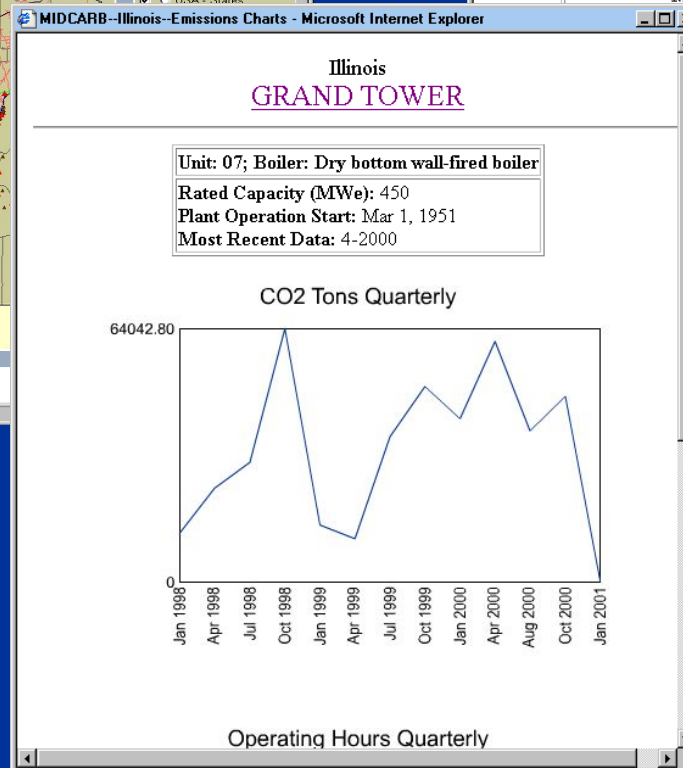
# Applications of Spatial & Relational Data: MIDCARB



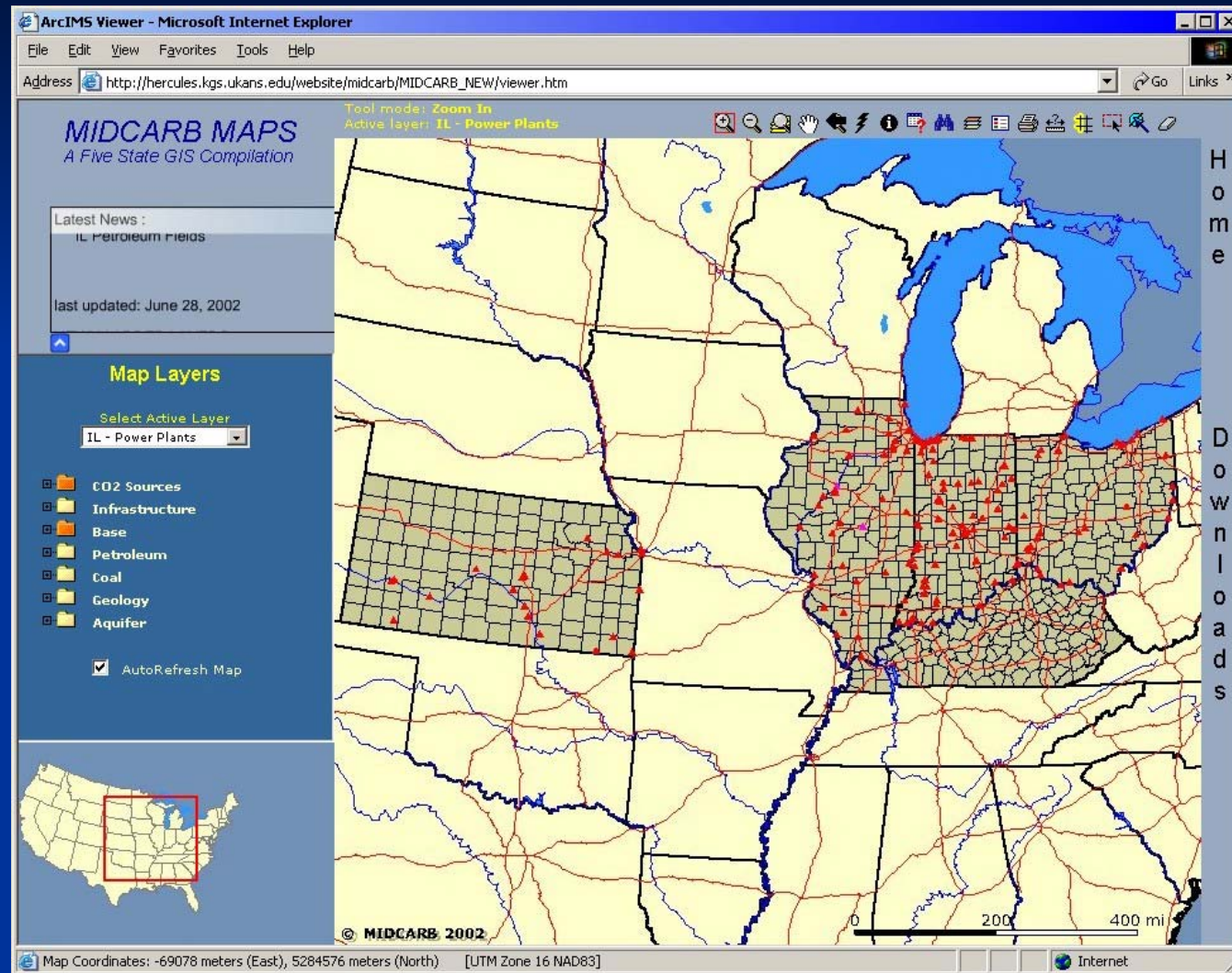
B) Zoom into areas and set layers to display



C) Query database and hyperlink to data charts

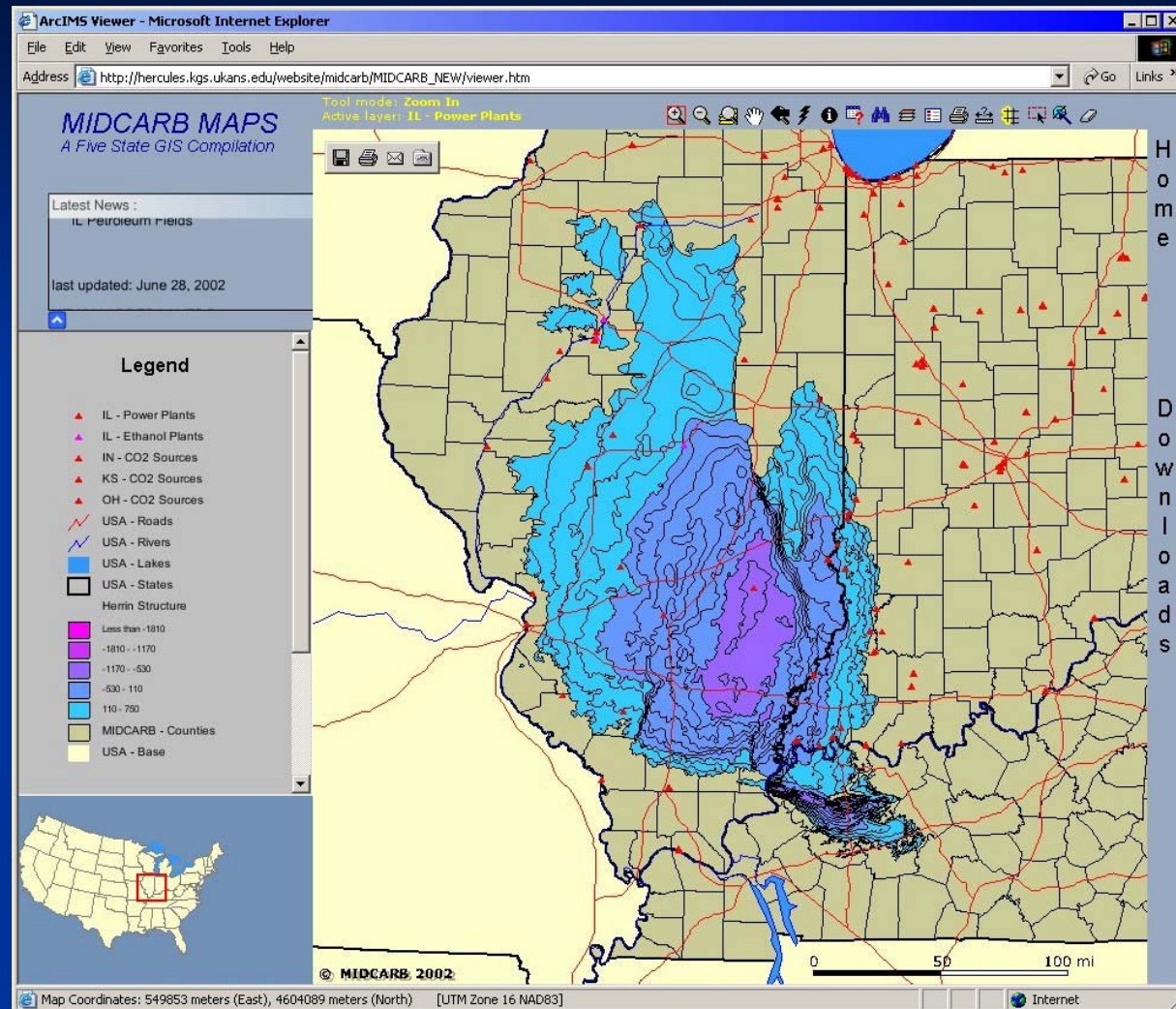


# Applications of Spatial & Relational Data: MIDCARB



New IMS example 1

# Applications of Spatial & Relational Data: MIDCARB



New IMS example 2



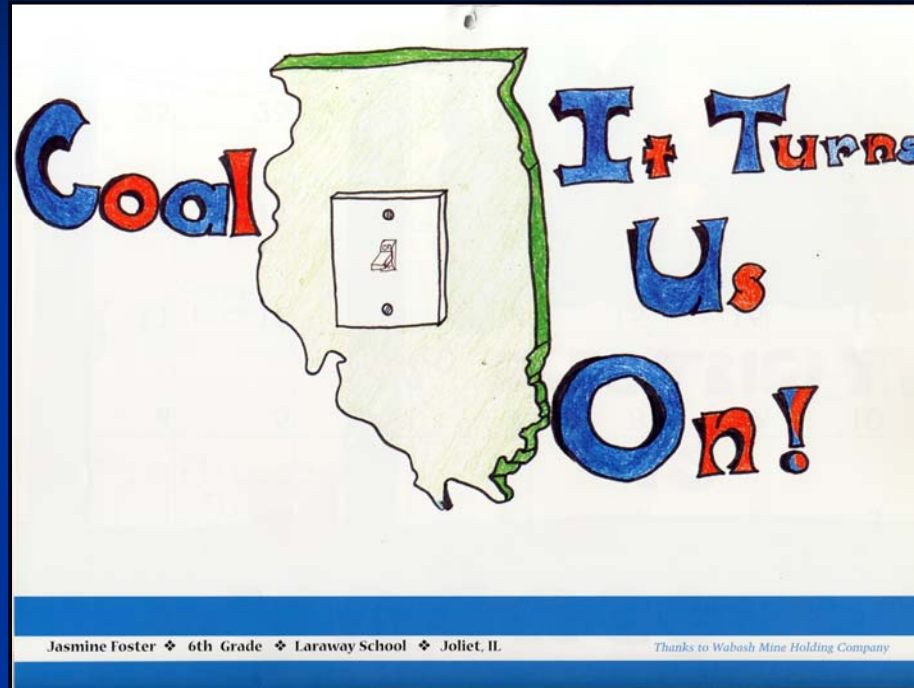
# Applications of Spatial & Relational Data: MIDCARB

## Future Directions

- Additional geologic layers  
(plus more metadata, downloadable shapefiles)
- Analysis functionality  
(volumetric calculations, distance buffers, etc.)
- Replicate IMS instance at other states

# Acknowledgements

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