An Update on the Midcontinent Interactive Digital Carbon Atlas and Relational dataBase (MIDCARB) and its Future

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www.midcarb.org
The MIDCARB states have solid fossil energy industries with varying production amounts in each state.

<table>
<thead>
<tr>
<th>State</th>
<th>Coal (Thousand Short Tons)</th>
<th>Natural Gas (Million Cubic Feet)</th>
<th>Petroleum (Thousand Barrels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illinois</td>
<td>33,783</td>
<td>185</td>
<td>10,092</td>
</tr>
<tr>
<td>Indiana</td>
<td>36,738</td>
<td>1,064</td>
<td>2,022</td>
</tr>
<tr>
<td>Kansas</td>
<td>176</td>
<td>481,445</td>
<td>33,942</td>
</tr>
<tr>
<td>Kentucky</td>
<td>133,834</td>
<td>81,723</td>
<td>2,970</td>
</tr>
<tr>
<td>Ohio</td>
<td>25,400</td>
<td>100,107</td>
<td>6,050</td>
</tr>
</tbody>
</table>

Fuel Mix for Electricity Production Varies Widely in MIDCARB States (2001)

Source: 2001 DOE/EIA data.
Total Energy Consumed in MIDCARB States (2001)

Source: 2001 DOE/EIA data.
Total CO$_2$ Emissions in MIDCARB States, 2000

2000 US Census Bureau and 2000 DOE/EIA data
Geologic Sequestration Potential

• Active and Depleted Oil and Gas Reservoirs
  – Value-Added Sequestration from High Quality Sources
    • Dubois and Nuttall have presentations at this conference
• Saline Aquifers
• Deep and non-economical Coal Beds
  – Value-Added Sequestration
• Unconventional Gas Reservoirs
  – Devonian Black Shale
  – Tight gas sands
Industrial Sources of CO₂

• Power Plants – Coal, Oil and Natural Gas
• Ethanol Plants
• Cement Plants
• Fertilizer Plants
• Solid Waste Landfills
• Other industrial plants that burn fossil fuels
Carbon Management Data Online

• Data is Maintained at Local Level
  – Current
  – Detailed
  – Accurate

• Online Access
  – Users Driven
  – Flexible Query and Display
  – Access to Products and Data
Ohio
ASHTABULA
Facility is a UT owned by CLEVELAND ELECTRIC ILLUM CO

Select chart desired: CO2 || SO2 || NOX || Mercury

CO2 Tons

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Last year reported: 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO2 (Tons)</td>
<td>1,404,020.70</td>
</tr>
<tr>
<td>SO2 (Tons)</td>
<td>4,153.40</td>
</tr>
<tr>
<td>NOX (Tons)</td>
<td>1.43</td>
</tr>
<tr>
<td>Mercury (lbs)</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Part of the MIDCARB project
Programs Feb. 2003
Data Integration

ColdFusion Data Pathways:

- Illinois (Oracle)
- Indiana (SQL Server)
- Kansas (Oracle)
- Kentucky (SQL Server)
- Ohio (SQL Server)

ColdFusion Request

Web browser

www.midcarb.org
Kansas Oil and Gas Field Viewer

STEWART MISSISSIPPIAN & MORROWAN Produces Oil Active
Legal Field Definition

Legend
- PLSS
- Highways
- Interstate
- US Highway
- KS Highway
- Roads
- Rivers and Streams
- County Boundary

Table of Contents
- Visible
  - Current Oil & Gas Wells (STEWART)
  - Downbad Wells
  - Current Field (STEWART)
  - Other Fields in Same Formation(s)
  - All Fields in Area
  - All Wells in Area
  - PLSS
  - Highways
  - Roads
  - Rivers and Streams
  - Major Streams
  - Water Bodies
  - City Boundary
  - County Boundary
  - View Aerials
  - View Topo

Zoom Level: 1.5
- Zoom In
- Zoom Out
- Pan
- Identify Field
- Identify Well
- Full Field Extent

Done
Coalbed Structure Over Multiple States: Herrin
Unconventional Reservoir: Mississippian-Devonian Shale Thickness

- Thin <20’
- Thick >3,600’
Distributed Management
MIDCARB calculators

- CO₂ Properties
- Power Plant Locator
  - By State
  - By Facility type
  - By Air Emissions
- Sequestration Potential
  - In Oil Reservoirs
  - In Aquifers

[Image of MIDCARB calculators interface]
Future of MIDCARB

• Improve Data and Coverages

• Move to support
  – Open GIS Consortium/Web Map Service (OGC/WMS)
  – XML and other open access tools

• Improve Distributed Management Tools
  – Multiple Servers (Hand-Off to Local Server)

• Modify the current MIDCARB Internet Map Server to support additional states.
Future of MIDCARB?