



# **Southwest Regional Partnership on Carbon Sequestration: A Test Case Model in the San Juan Basin**

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# Introduction

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**The Southwest Regional Partnership on Carbon Sequestration is a collection of experts in geology, economics, engineering, public policy and public outreach. One of the purposes of the partnership is to develop a high-level methodological framework and analysis to address the physical, economic and policy requirements necessary to develop a carbon sequestration project in the southwestern region of the United States. The methodological framework was applied to four power plants in New Mexico and several geologic sinks in the San Juan Basin as a test case for the framework.**

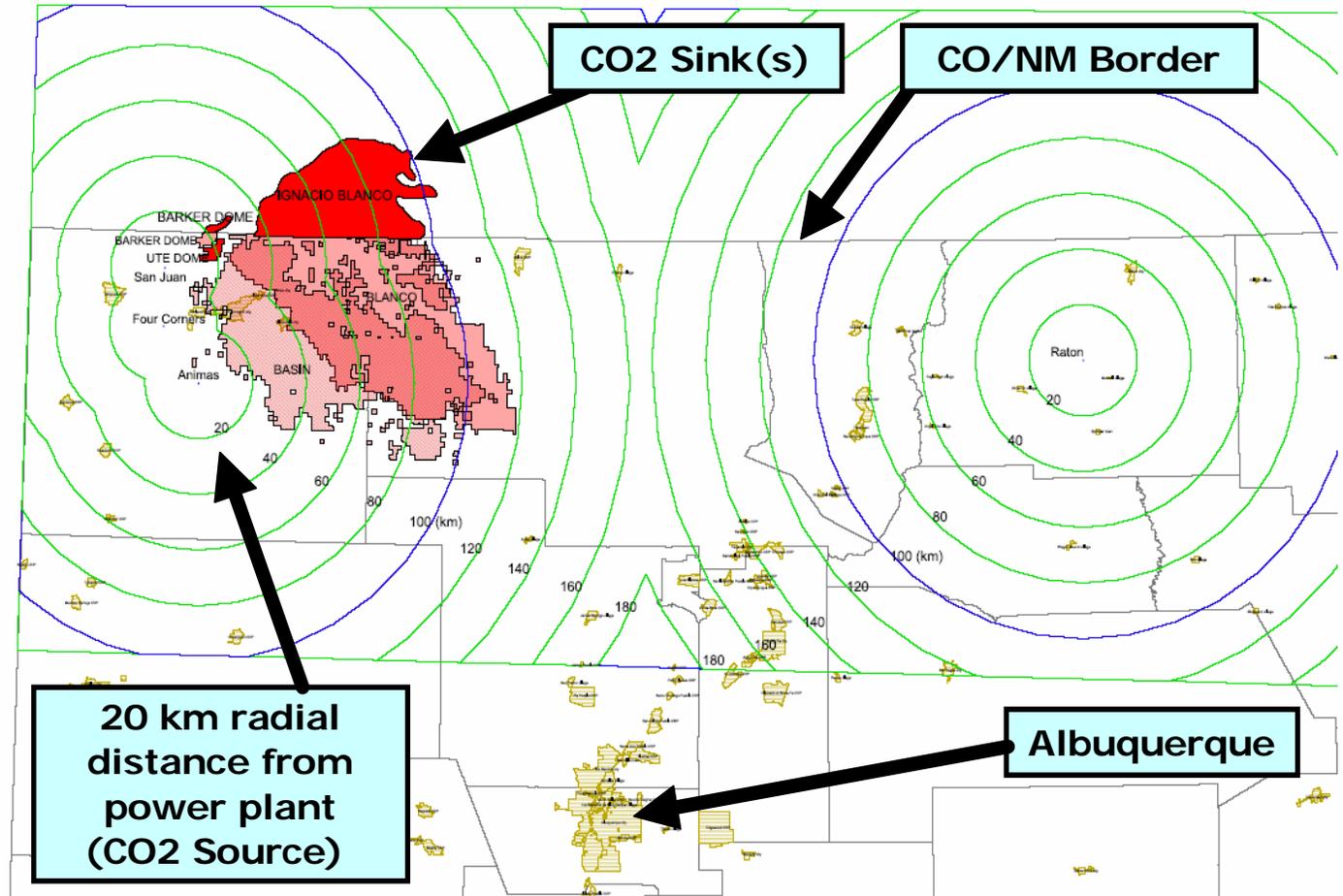
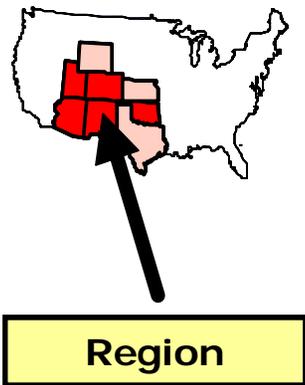


# Why the San Juan Basin?

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- **Offers a starting point for public outreach meetings using models as education tools**
- **New Mexico and Colorado share the basin**
- **Produces oil and natural gas (amenable geology to sequestration)**
- **Cross-collaboration from the Colorado Geological Survey and the New Mexico Bureau of Geology & Mineral Resources**

# Test Case: Northern New Mexico and Southern Colorado





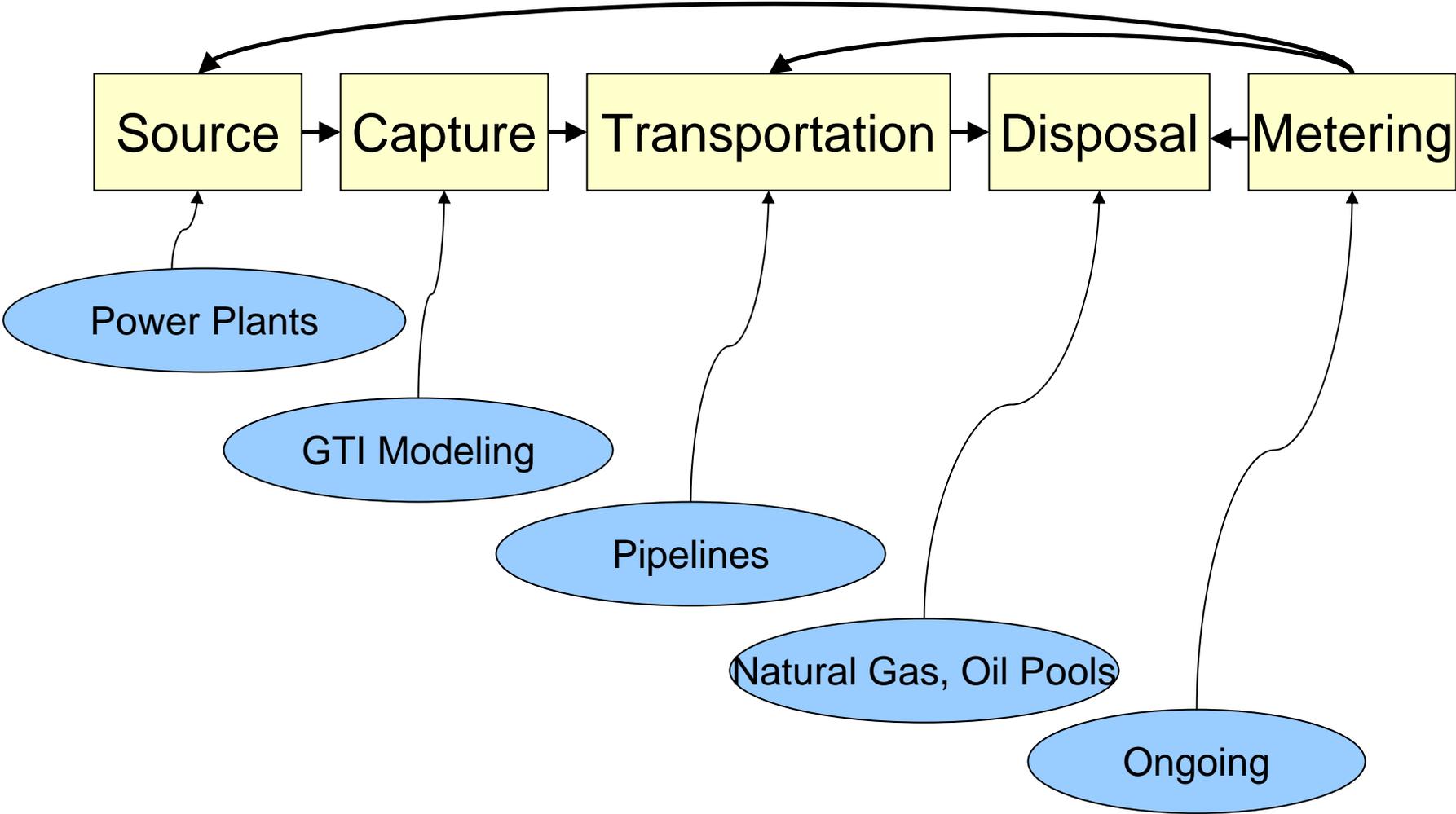
# San Juan Basin Test Case Model

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- **Initial Test Case Study**
  - **San Juan Basin region**
  - **Select New Mexico power plants**
  - **Select underground storage sites (7)**
    - » **≥ 3000 feet deep**
    - » **Have desirable geological characteristics**  
(e.g., low chance of CO<sub>2</sub> escaping into surrounding strata or the surface)
    - » **Within a certain distance from the power plant(s)**
  - **Look at “what if” combinations of sources (power plants) and storage sites**



# Model Overview





# Mass Balance Sector of Model: CO<sub>2</sub>

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- **Sources of CO<sub>2</sub>:**
  - Select power plants in NM
  - Emissions & Generation Resource Integrated Database (EGRID)
- **Capture and Transport:**
  - 90% capture of the CO<sub>2</sub>
    - » GTI used the IECM-CS Model (Carnegie Mellon)
  - Williams (Princeton) & Ogden (UC Davis) publications for pipeline flow rates
- **Sinks:**
  - Sink characterization team developed a shortlist of 7 sinks in Southern CO and Northern NM
  - Oil and Natural Gas Pools



# Cost Sector of Model

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- **Capture Costs:**
  - GTI used the ICEM-CS Model developed by Carnegie Mellon University for DOE
- **Transportation Costs:**
  - Pipeline and Disposal Well costs from Williams & Ogden publications
- **Disposal Costs:**
  - Disposal Well and associated costs from Williams & Ogden publications



# Regulatory Verification Sector of Model

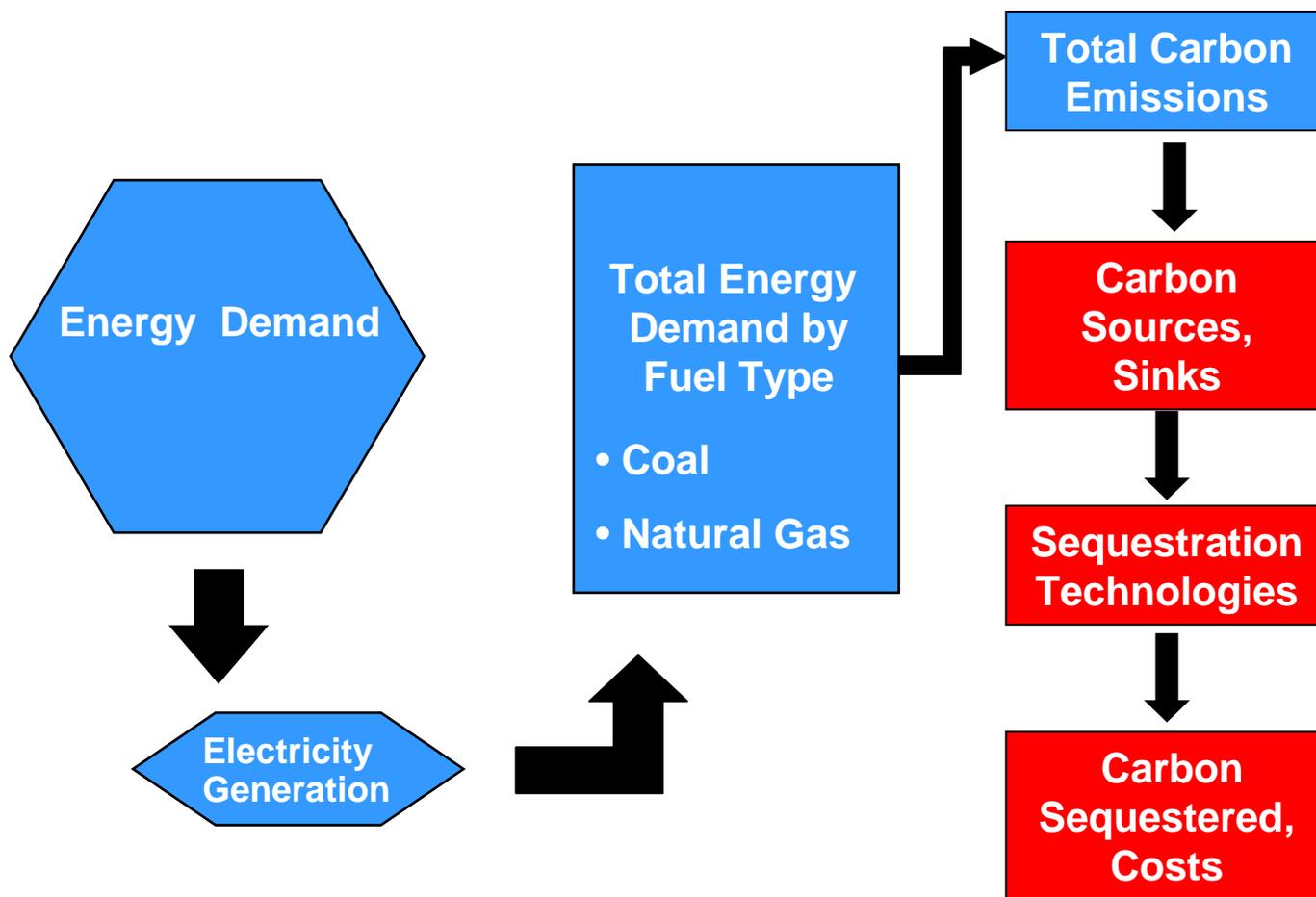
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- **Monitoring, Measuring, Verification (MMV):**
  - Ongoing information/data collection
  - Initial and subsequent costs for MMV
- **Begin to focus on potential sites:**
  - Best technologies for the cost
  - Spatial aspects
  - Temporal aspects



# Integrated Assessment: Regional Energy Model and Test Case Work

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# Model Interface

**SOUTHWEST REGIONAL PARTNERSHIP ON CARBON SEQUESTRATION: TEST CASE MODEL**

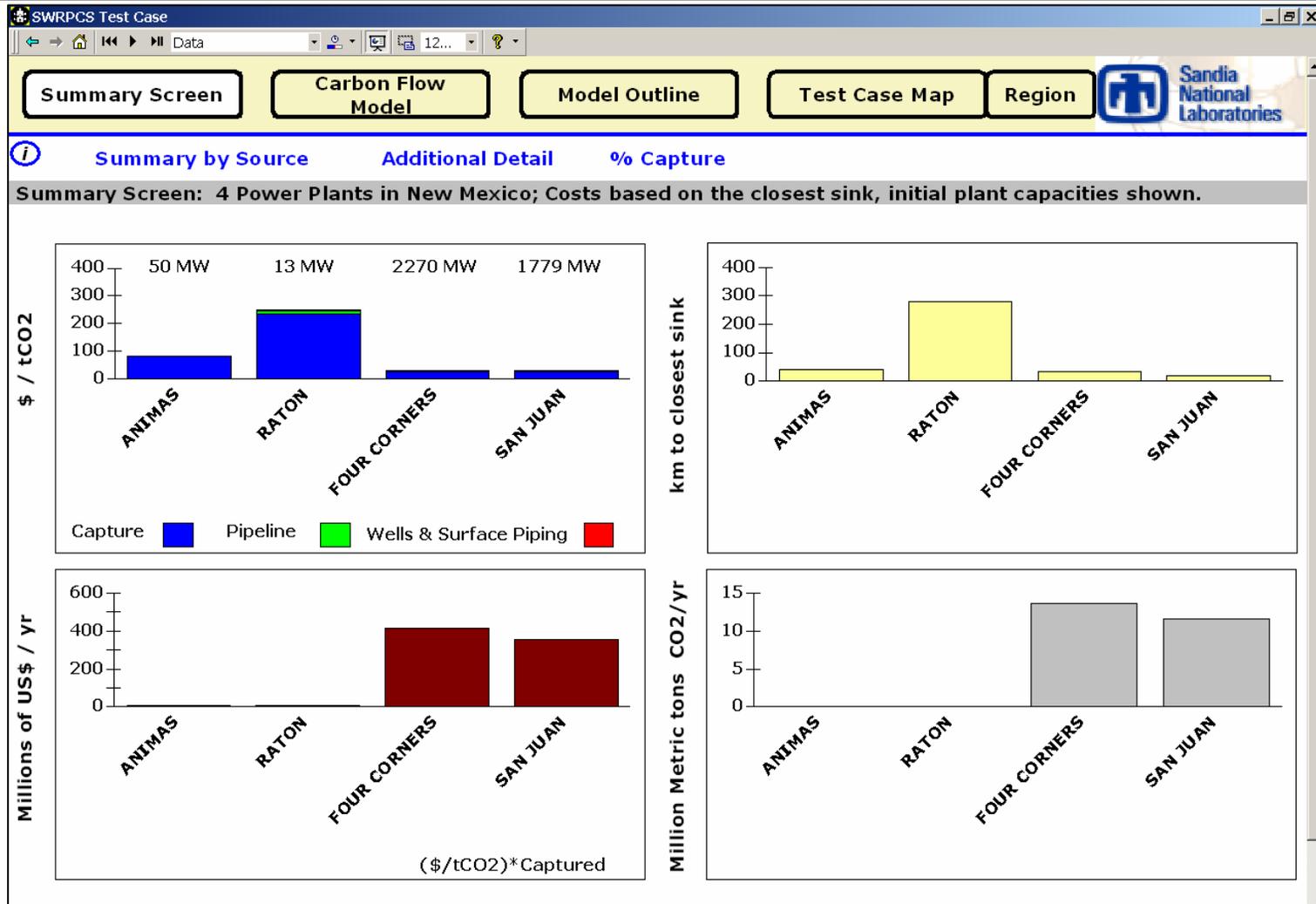
**Prototype Version 1.0  
April 2005**

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**EXPLANATION**

- Annual mass of CO<sub>2</sub> emissions from power plants, in million tons per year (mtpy)
- Natural CO<sub>2</sub> reservoir
- Major sedimentary basin
- CO<sub>2</sub> pipeline (flow in million tons per year)
- CO<sub>2</sub> production (same key as emissions)

# Model Interface: Prototype Results Screen





# Issues to Address

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- **Carbon Model Issues**
  - Ongoing development for additional user options
  - Time scale, projections, costs, granularity
- **Regional Allocation**
  - Economic data on political boundary basis, sources and sinks are geographic
  - Regulatory issues by political boundary
- **Sources of Carbon**
  - Utility vs. Non-Utility
- **Future Modeling Efforts**
  - Focus on demonstration test cases