Maximizing Traditional Energy Sources
Council of State Governments
State Trends and Leadership Forum
Oklahoma City, OK

Chris VandeVenter, Legislative Representative
Basin Electric Power Cooperative
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Future of Energy

• Overview of Basin Electric Power Cooperative
• Resource Development
• Energy Demands and Growth
• Energy Efficiency and Conservation
• Climate Change and Carbon Management
• Rail Transportation Issues
Basin Electric Power Cooperative
MEMBER SYSTEMS
serve 2.5 million consumers
Power Supply Facilities
3,000 MW

- Miles City Tie
- Rapid City Tie
- Stegall Tie
- Sidney Tie
Coal: 2,300 MW
Natural Gas: 181 MW
Oil: 115 MW
Wind: 136 MW
Other: 22 MW
Heat Recovery Projects

22 MW
• Built by ANG, a consortium of energy companies
  – Began commercial operation in 1984
• ANG defaulted on $1.5 billion DOE loan guarantee in 1985
• Basin Electric formed Dakota Gasification in 1988 to purchase the plant
• Synfuels plant produces about 150 mmscf of natural gas daily
• $1 billion repayed to U.S. through revenue sharing and canceled tax credits
Basin Electric Member Load Growth

$5.9 Billion

New Investment in our system

1947
1834
3781

4.52%
Resource Development
1,750 MW

Coal - 940 MW
Gas - 490 MW
Renewable - 325 MW
Transmission
Dry Fork Station (WY)
385 MW
Leland Olds Station

Add Scrubbers
$410 million
Leland Olds

98% SO2 Removed
LRS Turbine Upgrades
24~45 MW

2007-2009
Antelope Valley Station
Air Jigging
Reasons to pursue efficiency and conservation

• Comply with state energy-efficiency requirements
• Reduce deficits and avoid need for purchase power
• Reduce operating costs and save customers money
• Meet future load growth/reduce demand
• Improve member service
• Reduce carbon emissions
IEA Energy Technology Perspectives

Emission reduction by sectors

MAP Scenario:
32 Gt CO₂ reduction in 2050

Industry 10%
- Energy & feedstock effic. 6%
- Materials & products effic. 1%
- Process innovation 1%
- Cogen. & steam 2%

Buildings 18%
- Space heating 3%
- Air conditioning 3%
- Lighting, misc. 3.5%
- Water heat., cooking 1%
- Appliances 7.5%

Transport 17%
- Fuel economy in transport 17%

End-use efficiency 45%

Power Gen 34%

- Coal to gas 5%
- Nuclear 6%
- Fossil fuel gen. eff 1%
- CCS 12%
- Hydro 2%
- Biomass 2%
- Other renew. 6%

- CCS in fuel transformation 3%
- CCS in industry 5%
- Fuel mix in building 5% and industry 2%

CO₂ Capture & Storage (CCS) contributes 20% of total

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Basin Electric Efforts

- Efficiency improvements at Basin
  - HDQ efficiency – 135,000 kwh/month
  - Turbine Upgrades at Generators
  - Load Management
  - Plug-in Hybrid Project

- Conservation happens at the local level
- Basin developing conservation program to assist members
Plug-in Hybrid
10-29-2007
Potential CO₂ reductions in the U.S. Electricity Sector
Electric Power Research Institute, August 2007
Cost of Climate bills

**Bingaman/Specter**
- Electric power and coal mine allowances
- 93% business as usual then decline
- Time for industry to develop carbon capture technology
- Economic safety value for cost of allowances

**Lieberman/Warner**
- Electric power allowances
- 42% of business as usual
- +2% to load serving entities (retail cooperatives)

- **BEPC rate increase (2017)**
  - $343 million (50%)

Costs will vary depending on price of carbon allowances
Resource and Carbon Planning

• Basin ITC application - IGCC -2006
• Basin’s CO₂ efforts will continue
  – Developing Efficiency & Conservation Plan
  – Diversified Generation
    • 10% renewable capacity goal, (wind, waste heat)
  – Research & Development
    • Plains CO₂ Reduction Partnership, Canadian Clean Power Coalition, IGCC Technology Evaluation at DOE test facility, Electric Power Research Institute

• Building future coal generation – Demonstrating Carbon Capture and Storage (CCS) is vital
Dakota Gasification Company (DGC)
World’s Largest Carbon Sequestration Project

- Bismarck
- Beulah
- Weyburn
- Estevan

10 Million Tons Sequestered To Date
Natural Gas vs. IGCC

Coal → DGC → Gas Turbine

50% CO₂ Sequestration
Baseload Generation Dilemma

- DGC uses old Lurgi technology
- IGGC will use next generation of gasifiers
- We know how to capture and transport CO2 from an IGCC plant, but not how to cost effectively gasify Lignite or PRB coal using newer gasifiers
- We know how to burn coal in PC plant, but not how to capture the CO2 output
Demonstration/Commercialization Project

240 mmscf/d Pipeline capacity

Current flow rate: 153 mmscf/d

57 mmscf/d

CO₂ flood operation

Compressors

Great Plains Synfuels Plant

Antelope Valley Station

CO₂ PIPELINE

GAS

FLUE

LOW PRESSURE STEAM

CARBON CAPTURE
Carbon Capture & Storage

Challenges

• Great risk in being the first to commercialize the newest technology
  - Reliability
  - Cost
  - Station Power for CCS (20 to 40%)
  - Performance/guarantees
Carbon Capture & Storage

• Opportunities
  – EOR is a driver for our AVS CCS project
  – EOR is a bridge for understanding future sequestration in saline aquifers & unrecoverable coal seams
  – Our industry needs Carbon Capture Technology demonstrated – R & D must continue
  – Policies and regulations must be developed for CCS
Rail Transportation

- National Problem Regional Significance
  - Coal deliveries (high costs and supply)
  - Some utilities importing foreign coal to make up shortfalls
  - Competition nonexistent in many rural areas
  - Captive rail customers receive unfair treatment
  - All industries are affected
Railroad History

- 1970’s – Railroads in financial trouble
- 1980 – Railroads deregulated (Staggers Act)
  - Competition determines rates
  - Surface Transportation Board to ensure reasonable rates where no competition exists
- Dramatic financial turnaround
- 1976 to 2004 Class I RR’s = 63 to 7
- 4 Mega RR’s
  - Control more than 90 percent of the industry’s revenue
  - Own over 90 percent of the U.S.’s track miles

Source: US National Transportation Atlas
Federal Rail Policy

• Railroads exempt from nation’s antitrust laws

• Surface Transportation Board (STB) is responsible for protecting rail customers from railroad abuse of monopoly power

• STB has been doing nothing to protect captive rail customers
Typical STB Rate Case

Complaint Filed
$172,000

Evidence

Is the rate reasonable?

Yes

Rate Relief

No

$3 to $5 million

Railroad rebuttal

STB Review

STB Decision

18-24 Months
LRS Rate Case

- STB Case – October of 2004
  - Rates doubled – petition for relief
  - $6 million spent
  - STB suspended case in early 2006 – rules changed
  - STB denied relief in September 2007
  - STB said rule change “prejudiced” our case, after assurances it wouldn’t affect us
  - LRS is appealing STB decision at considerable additional cost
Captive Rail Rates

- Direct Cost of Transportation: 100%
- BNSF System-Average Rates: 131%
- Minimum STB Rate: 180%
- STB TMPA Decision (2003): 193%
- LRS Rates: 575%

Bar chart showing Captive Rail Rates with various percentages.
Laramie River Station

March 2006
154,000 tons
Laramie River Station

April 2007
1.1 Million Tons
Captive Rail Solution

- S.953/H.R. 2125 Rail Competition Acts
- S. 772/H.R. 1650, Railroad Antitrust and Competition Acts
- Congressional Hearings
- National Association of Attorneys General – antitrust bill, letter of support
• Load growth driving electricity
• Carbon driving pace of new power plants
• Efficiency is a fuel resource and reduces emissions
• Carbon Capture and Storage not yet demonstrated on a commercial scale
• More research and development funding/incentives for CCS
• Rail monopoly and transportation constraints can affect power plant decisions