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# **PROMOD Economic Analysis**

**Latest Results & New Capability**

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# Introduction

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- Latest PROMOD runs:
  - updated powerflow cases to include all of the upgrades from the recently-released 10-Year Assessment (TYA)
- Observations:
  - TYA reliability transmission projects often lower production costs by relieving constraints
  - fixing reliability constraints tends to benefit the Base Case the most
  - TYA is essentially upgrading/fixing the Base Case so it is close to optimal—other alternatives not optimized yet
  - benefits of the alternatives have declined relative to the Base Case





# Latest Baseline Results

- Compare the carrying costs for each alternative to the “production cost” savings from PROMOD.

**Costs for each Representative Project–Baseline Results**

<b>Project</b>	<b>Total Capital Costs (2003\$ Mil.)</b>	<b>Approximate Annual Carrying Cost (2003\$ Mil.)</b>	<b>“Production Cost” Savings Relative to the Base Case (2003\$ Mil.)</b>	<b>Rough Market Savings Estimate (3 X Production Cost Savings)<sup>2</sup> (2003\$ Mil.)</b>
Base Case	\$0	N/A	0	0
Base Case Plus 2 Fixes	\$20	\$1.8	\$10.0	\$29.9
South: Byron–NMA	\$221	\$19.9	\$14.6	\$43.9
South: Paddock–Rockdale	\$59	\$5.3	\$10.2	\$30.5
Southwest: Salem–NMA <sup>1</sup>	\$342	\$30.7	\$14.6	\$43.9

<sup>1</sup> Salem-NMA includes a fix for Salem to Maquoketa.

<sup>2</sup> Using a model similar to PROMOD, the California ISO found that modeling actual bidding behavior (rather than just production costs) increased cost savings for major transmission upgrades by 2 to 3 times.

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## A Comeback for Coal

With the country's demand for power growing steadily, companies are proposing to build more than 100 coal-fired electricity plants in 36 states.



Electricity figures for 2002 in megawatts. Figures are estimates of all plants' operating capacity, which is usually a little higher than actual output.

Electricity from proposed coal-fired plants					
	Electricity from coal	Share of state total		Electricity from coal	Share of state total
Alaska	118	5.3%	300	Missouri	11,821 54.8% 500
Arkansas	3,958	33.2	800	Montana	2,485 48.1 2,643
Arizona	5,819	27.0	2,600	N. Dakota	4,246 87.3 675
California	439	0.7	2,500	Nebraska	3,212 51.1 820
Colorado	5,097	50.1	2,230	New Mexico	4,387 67.2 2,350
Florida	13,328	25.2	1,100	Nevada	2,769 36.9 2,850
Georgia	14,909	40.1	1,600	Ohio*	24,287 71.0 1,550
Iowa	6,370	64.1	790	Oklahoma	5,674 32.3 2,200
Idaho	19	0.6	1,800	Pennsylvania*	20,222 46.5 2,230
Illinois	17,426	34.9	10,731	S. Carolina	6,461 29.7 1,820
Indiana	21,805	76.5	550	S. Dakota	481 15.9 3,100
Kansas	5,510	49.1	660	Tennessee	10,310 44.8 1,000
Kentucky	16,154	73.2	6,453	Texas	21,146 20.8 3,628
Louisiana	3,796	13.2	600	Utah	4,861 78.6 1,590
Mass.	1,723	12.8	150	Virginia	6,641 30.3 1,300
Michigan	12,899	40.2	1,485	Wisconsin	7,483 51.1 2,800
Minnesota	6,033	50.2	782	West Virginia	15,366 90.5 1,735
Mississippi	2,664	17.8	2,185	Wyoming	6,080 90.2 1,954

\*One plant in Ohio and two in Pennsylvania do not have estimates on their sizes.

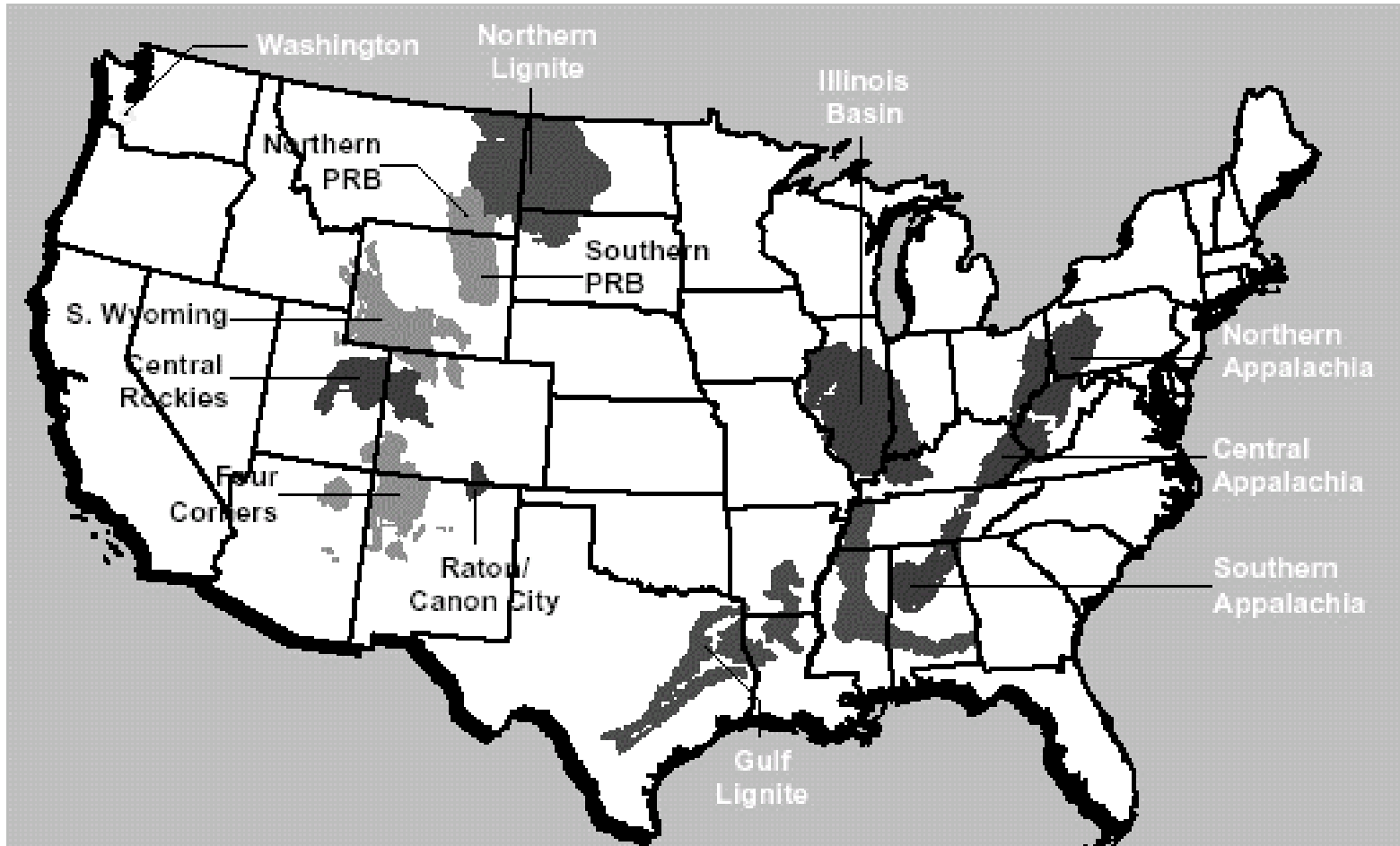
Sources: McIlvaine Company; Energy Information Administration

# Fuel of the Future? Some Say Coal

A Boom in Plant Proposals Is  
Linked to Natural Gas Scarcity

New York Times, Nov. 20, 2004

- Based on the map not surprising that alternatives to the South and Southwest tend to have lower “production costs”
- Illinois and Kentucky have the highest number of proposed coal plants



Source: PowerMAP

## US Coal Supply Regions



# Narrow Constrained Area

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- Primary effects of being defined as a Narrow Constrained Area (NCA) by MISO
  - congestion costs for resources outside the ATC footprint forgiven (e.g. Boswell for WPPI, Zion for We-Energies, etc.) for first 5 years
  - lower threshold for bidding behavior to be considered anticompetitive by the MISO Independent Market Monitor (IMM)



# Narrow Constrained Area

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- Definition of a Narrow Constrained Area (NCA)
  - area flowgates/constraints binding for at least 500 hours per year—based primarily on TLR activity
  - at least one supplier has generation resources that are “pivotal”, i.e. no other supplier’s generation can relieve the constraint
- WUMS and Northern WUMS defined as NCAs



# Narrow Constrained Area

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- IMM can remove NCA designation if constraints are expected to be binding less than 500 hours per year
  - Access alternatives could help to achieve this
  - IMM/MISO could probably use PROMOD to show that:
    - constraints are binding less the 500 hours, and/or
    - there is no pivotal generation for the constraint
  - some constraints become more active as import capability increases, however, with more import capability there would probably be a decrease in pivotal generation



# MapAgent

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- New Capability: Using MapAgent to show LMP contours
    - New Energy Associates (NEA) has mapped generators but not loads yet
    - generators not as widely spread as loads
    - contour color scheme similar to that used on radar weather maps
  - Demo of hourly contours in MapAgent for August 7, 2012



# What's Next?

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- Focus analysis on a couple of alternatives and optimize them
- Map loads in MapAgent for at least the ATC footprint
- Drill down more into hourly details using the PROMOD Analysis Tool (PAT)—licensing in 2005