

Partial Impacts of Alternative CAIR-Plus EGU Controls on the Midwest Economy

Regional Air Quality Workshop
Rosemont, IL
November 16, 2005



Douglas Jeavons, Managing Director
3773 Cherry Creek N. Drive, Suite 850
Denver, Colorado 80209
800.748.3222
www.bbcresearch.com
jeavons@bbcresearch.com

Objectives of this analysis

- Estimate a portion of the economic impacts of electric utility controls exceeding U.S. EPA's CAIR rule on the Midwest economy – output and jobs
- Calculate impacts relative to a base case of EPA's CAIR rule (requiring 70% reductions of electric utility sulfur dioxide and nitrogen oxide emissions by 2015)
- Develop impact estimates for regional coal mining and for 9 of the most energy intensive industries in the region
- Impact estimates derived from June 2005 analysis by Jim Marchetti of direct costs of meeting alternative EGU BACT limits in the “LADCO EGU White Paper”

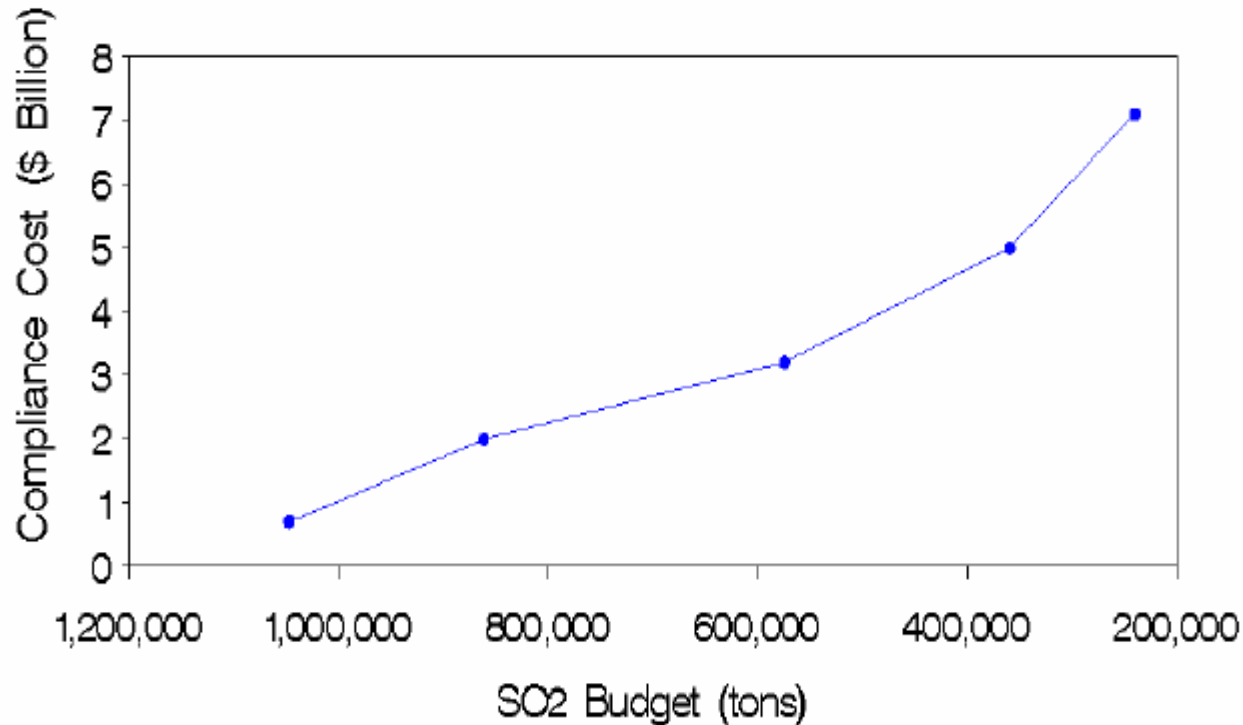
A note on assumptions

- LADCO's EGU White Paper incorporated STAPPA-recommended Best Available Control Technology (BACT) limits for existing ("EGU1") and new ("EGU2") generating units
- Marchetti's analysis applied these BACT emission limits to an historic 2000-2003 emissions baseline to estimate emission caps for SO₂ and NO_x
- The LADCO White Paper also developed intermediate levels of controls ("IM1" and "IM2")
- Our analysis treats the IM and EGU control levels as four alternative control scenarios
- The IM scenarios are assumed to apply in 2012, the EGU scenarios are assumed to apply in 2013
- LADCO is evaluating a future "grown" baseline that may reduce the stringency of caps associated with the STAPPA BACT emission rate limits

Summary range of impacts of alternative CAIR-Plus EGU controls compared to EPA's regulation (CAIR)

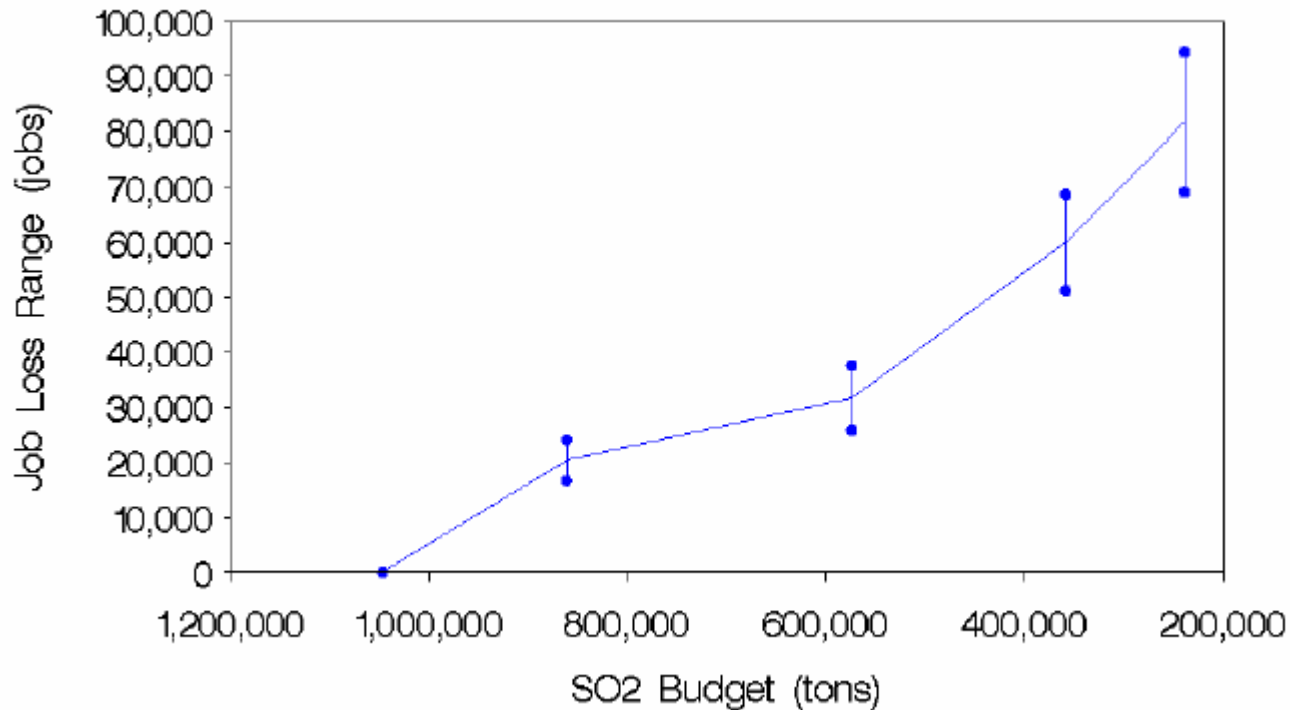
	<u>IM1 (2012)</u>	<u>EGU2 With Power Replacement (2013)</u>
Electric rate increases	4.7%	15.7%
Decreased annual output (\$2003)	\$1.9 – \$3.3 billion	\$9.0 – \$14.1 billion
Decrease in jobs	17,000 – 24,000	69,000 – 94,000

Direct costs rise with tighter SO2 caps ... from CAIR to EGU2



Note: For simplicity, only SO2 cap levels are depicted on the x axis.

Job losses increase with tighter SO2 caps ... from CAIR to EGU2

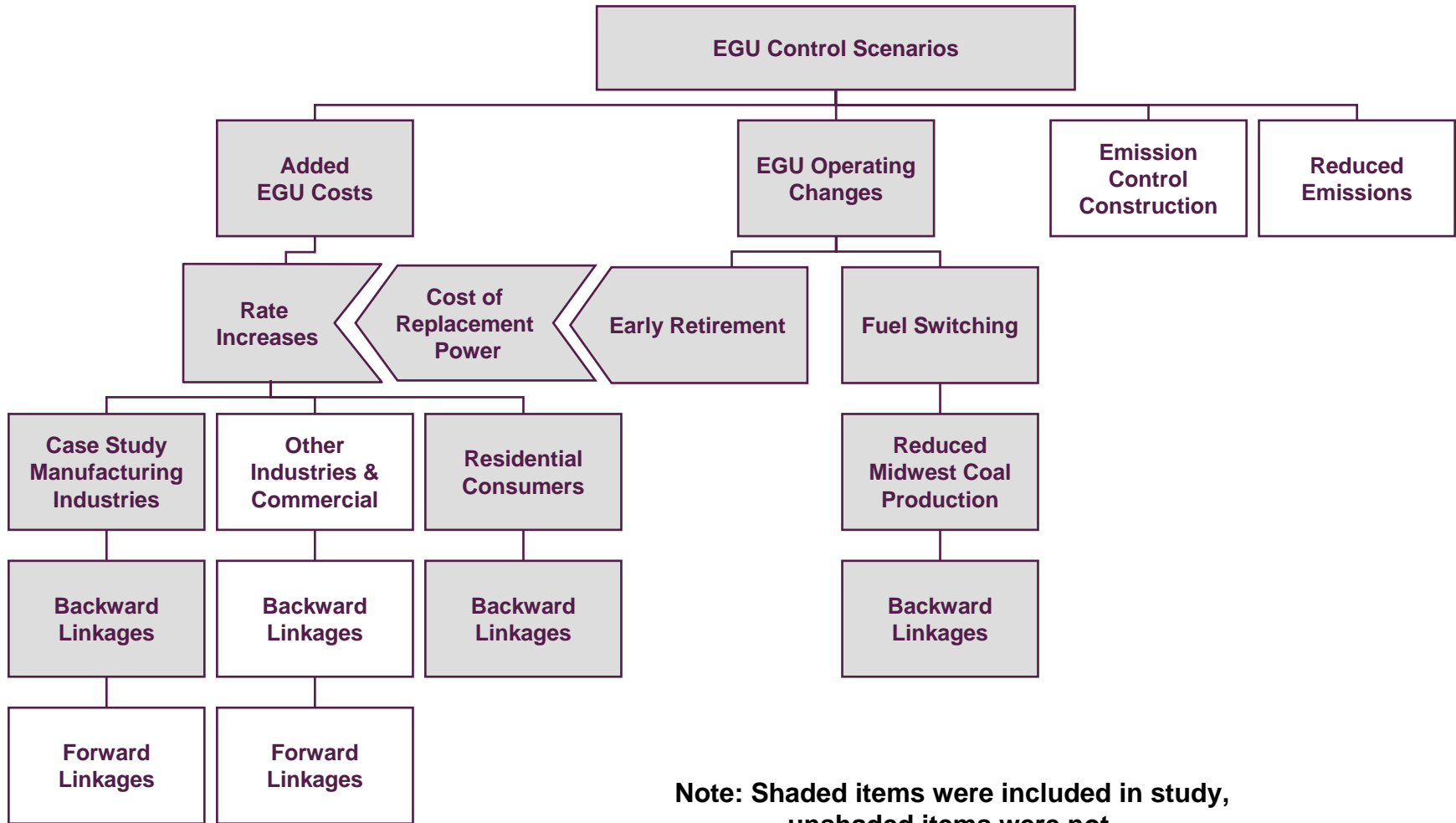


Note: For simplicity, only SO2 cap levels are depicted on the x axis.



Part 1:
Study Approach and Limitations

Factors included and not included in the economic study



Note: Shaded items were included in study, unshaded items were not.

Case study industries

Case Study Industry	Value of Electricity Purchased (Millions)	Percent of Total Outlay	2002 Employment					
			Illinois	Indiana	Michigan	Ohio	Wisconsin	Region
Food Products	\$848	0.89%	85,252	32,450	35,257	59,410	65,129	277,498
Paper Mfg	\$680	1.90%	27,110	12,144	15,750	27,578	42,971	125,553
Chemical Mfg	\$1,034	1.13%	52,476	30,569	30,185	47,751	13,611	174,592
Plastics & Rubber Production	\$830	1.63%	51,371	44,220	42,364	77,141	33,187	248,282
Computer & Electronic Product Mfg	\$170	0.52%	52,002	23,040	20,500	31,385	23,099	150,026
Primary Metal Mfg	\$1,212	2.34%	26,283	55,236	27,549	55,335	20,534	184,938
Fabricated Metal Production	\$713	0.98%	113,535	59,034	82,977	115,897	69,369	440,812
Machinery Mfg	\$451	0.56%	92,905	45,501	78,483	87,370	71,142	375,401
Transportation Equipment	\$1,093	0.41%	46,715	133,687	283,875	155,862	36,202	656,341
Coal Mining	<u>\$36</u>	1.48%	<u>3,976</u>	<u>3,041</u>	<u>0</u>	<u>2,584</u>	<u>0</u>	<u>9,601</u>
Total Case Study Industries	\$7,065		551,625	438,922	616,940	660,313	375,244	2,643,044
Total Industrial and Commercial	\$20,569		7,289,097	3,555,638	5,490,824	6,670,712	3,355,531	26,361,802



Part 2:
Impacts on Midwest Electricity Rates

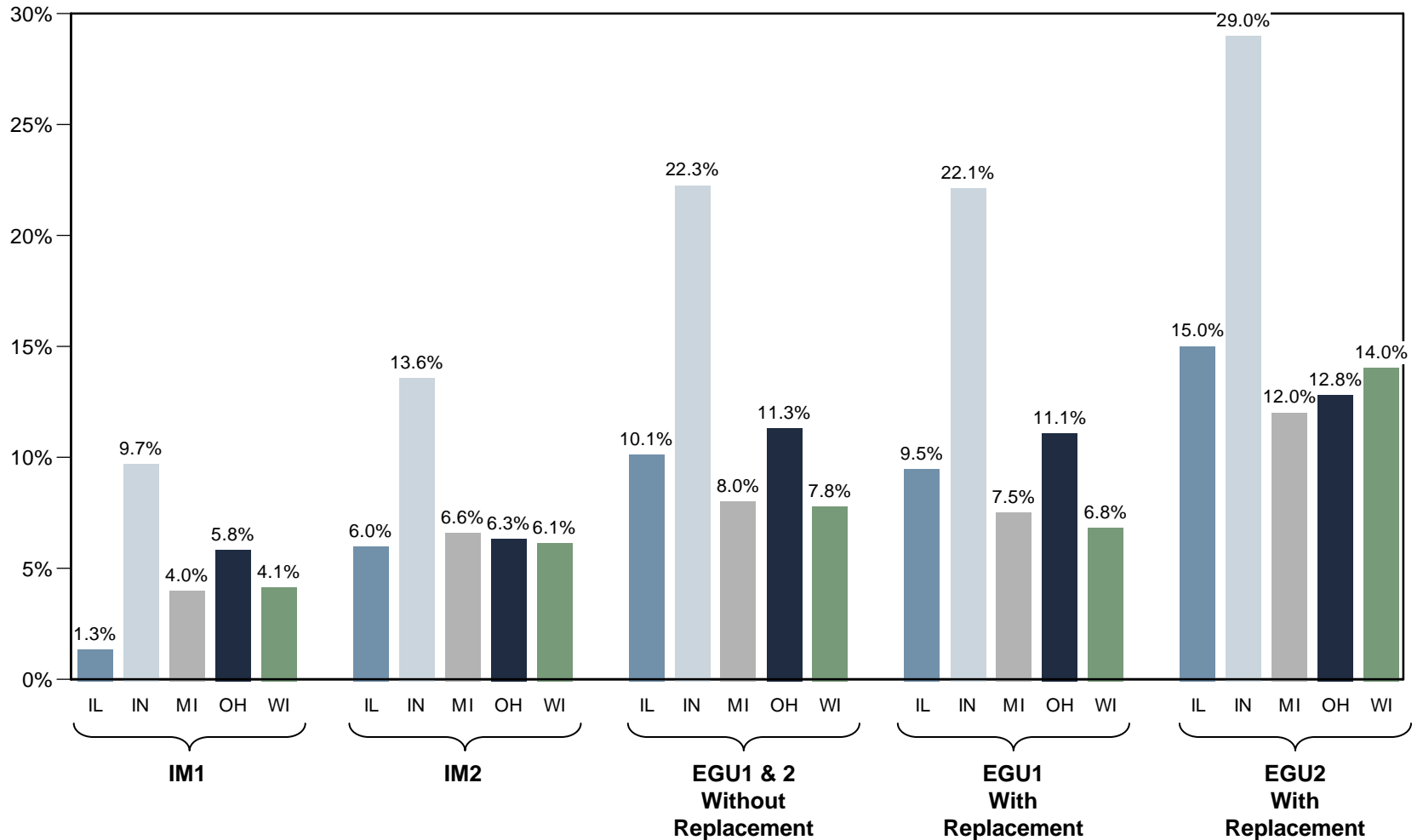
Projected annual direct costs of alternative CAIR-Plus EGU control measures (millions of 2003 dollars)

State	2012		2013		
	IM1	IM2	Without Replacement Power	With Replacement Power	
			EGU1/EGU2	EGU1	EGU2
Illinois	\$ 142	\$ 646	\$1,118	\$1,048	\$1,660
Indiana	622	873	1,496	1,488	1,949
Michigan	353	584	740	696	1,112
Ohio	713	773	1,447	1,418	1,640
Wisconsin	204	303	393	345	711
Region	\$2,035	\$3,179	\$5,194	\$4,995	\$7,073

Note: Totals may not add due to rounding.

Source: James Manchetti, Michael Hein and J. Edward Cichanowicz, 2005.

Impacts of alternative CAIR-Plus control measures on 2012 and 2013 electricity rates — percent change*



*Additional rate increases over and above increases needed to comply with CAIR Rule. IM1 and IM2 scenarios examined in 2012, EGU1 and EGU2 scenarios in 2013.

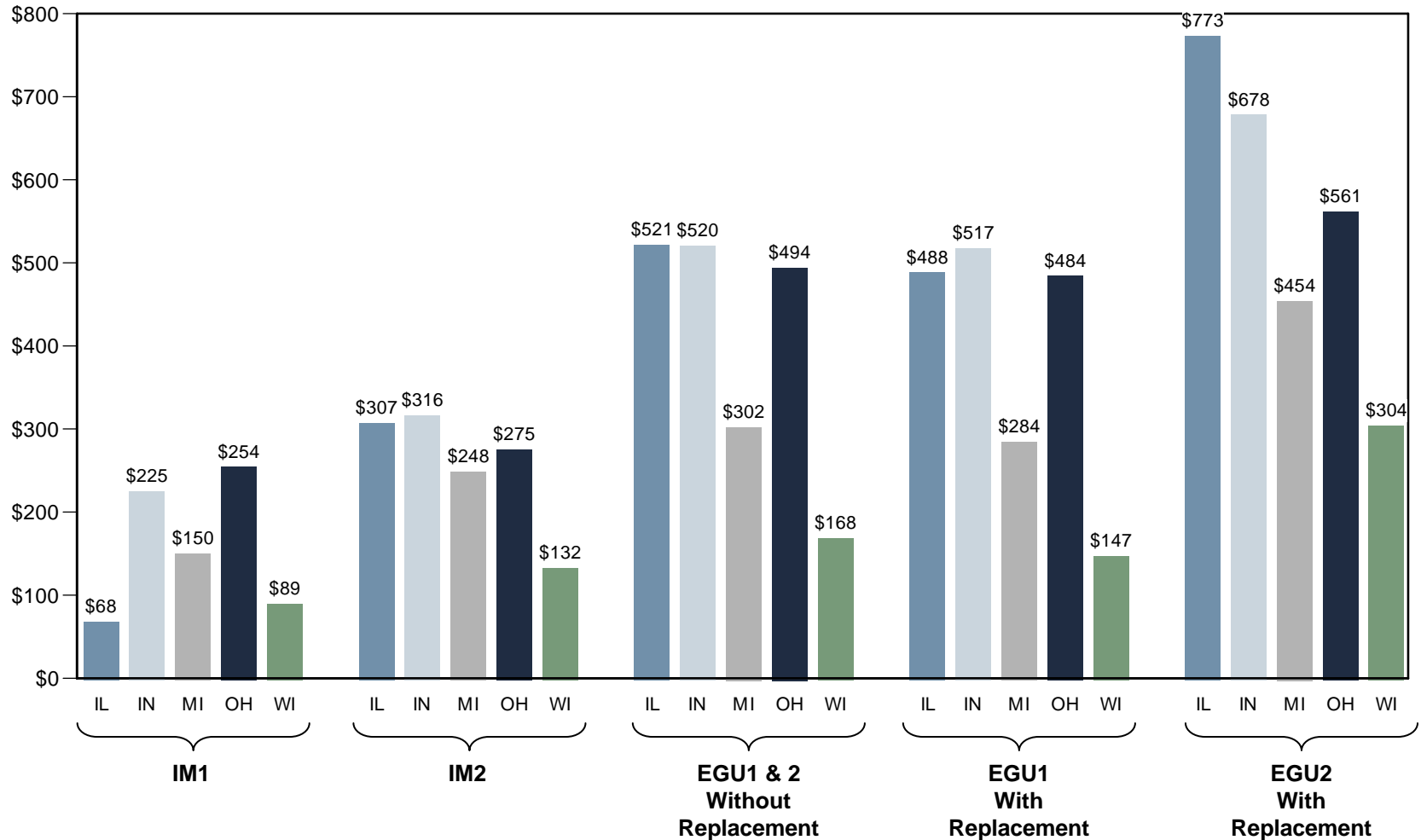
Effects of projected rate increases on affordability of industrial electric rates – EGU2

Affordability Ranking Among 50 States

State	Current (2003)	With Projected EGU2 Rate Increase (2013)
Illinois	29	38
Indiana	5	27
Michigan	31	35
Ohio	27	33
Wisconsin	24	32

Note: 1 = state with lowest rates and 50 = state with highest rates.

Additional annual electricity costs for residential customers under alternative CAIR-Plus EGU control measures* (millions of 2003 dollars)



*IM1 and IM2 scenarios examined in 2012, EGU1 and EGU2 scenarios in 2013.



Part 3:
**Combined Impacts on
Case Study Industries and Households**

Projected annual decrease in Midwest regional output under alternative CAIR-Plus EGU control measures (millions of 2003 dollars)

	2012		2013		
	IM1	IM2	Without Replacement Power	With Replacement Power	
			EGU1/EGU2	EGU1	EGU2
Case Study Industries	\$440 –\$1,340	\$660 –\$2,090	\$2,400 –\$4,670	\$2,360 –\$4,530	\$2,960 – \$6,070
Secondary Impacts	\$260 – \$830	\$400 –\$1,300	\$1,760 –\$3,180	\$1,730 –\$3,090	\$2,130 – \$4,080
Residential Impacts	\$1,160	\$1,820	\$2,870	\$2,760	\$3,910
Total	\$1,860 –\$3,330	\$2,880 –\$5,210	\$7,030 –\$10,710	\$6,850 –\$10,380	\$9,000 –\$14,060

Projected decreases in regional employment under alternative CAIR-Plus EGU control measures

	2012		2013		
	IM1	IM2	Without Replacement Power	With Replacement Power	
			EGU1/EGU2	EGU1	EGU2
Case Study Industries	1,130 – 3,680	1,700 – 5,750	6,590 –12,850	6,490 –12,490	8,080 –16,680
Secondary Impacts	2,190 – 7,060	3,290 –11,060	13,270 –25,300	13,060 –24,610	16,190 –32,730
Residential Impacts	13,400	20,940	33,050	31,790	45,060
Total	16,720 –24,140	25,930 –37,750	52,910 –71,200	51,340 –68,890	69,330 –94,460

Projected decreases in state employment under alternative CAIR-Plus EGU control measures

	2012		2013		
			Without Replacement Power		With Replacement Power
	IM1	IM2	EGU1/EGU2	EGU1	EGU2
Illinois	1,020 – 1,370	4,660 – 6,350	9,300 – 12,110	8,800 – 11,410	13,400 – 17,610
Indiana	5,380 – 8,180	7,590 – 11,730	17,680 – 24,330	17,510 – 24,150	22,280 – 31,140
Michigan	3,270 – 4,520	5,440 – 7,660	6,630 – 9,290	6,270 – 8,730	10,050 – 14,090
Ohio	5,510 – 7,800	5,960 – 8,600	16,410 – 21,120	16,190 – 20,780	18,300 – 23,660
Wisconsin	1,540 – 2,280	2,280 – 3,420	2,870 – 4,330	2,560 – 3,830	5,290 – 7,950
Total	16,720 – 24,140	25,930 – 37,750	52,910 – 71,200	51,340 – 68,890	69,330 – 94,460