Analysis of the Proposed Illinois Mercury Rule

Prepared for:
Illinois Environmental Protection Agency
Division of Air Quality

Prepared by:
ICF Resources, LLC

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This report is prepared for the Illinois Environmental Protection Agency (IEPA) and analyzes the cost impacts of the proposed Illinois Mercury Rule[1] using ICF's Integrated Planning Model (IPM®). This study focuses on the impacts of the mercury rule in terms of costs to the power sector and costs to electricity consumers. National level and state level results are presented. In addition, the study highlights the effects on generation, coal consumption, control equipment, and emissions.

Scenarios Examined

ICF examined three cases (or scenarios) using IPM as requested by IEPA:

(i) A Base Case with no additional Federal air regulations in place beyond existing regulations including the Title IV SO_2 program, the NO_x SIP Call requirements, and other state regulations in place (the Base Case)

(ii) A Case based upon the run above, but also including the Final Clean Air Interstate Rule (CAIR) and the Clean Air Mercury Rule (CAMR) as put forth by the U.S. EPA (the "CAIR/CAMR" case)

(iii) A case with the Clean Air Interstate Rule in place, the Clean Air Mercury Rule in place for all states but Illinois, and the proposed Illinois Mercury Rule (described below) for Illinois' affected sources. The CAMR mercury emission limit is adjusted downward by the level of the Illinois budget under CAMR.

The difference between a base case and any air regulatory policy case represents the impact of that policy. In this study, differences between the second and first case represents the cost of the CAIR/CAMR rule based on the assumptions underlying this study. The difference between the third and the first run represents the cost of the Illinois Mercury rule, based on those same assumptions. A comparison of these two *cost impact estimates* reflects the incremental cost of Illinois' mercury policy over the CAIR/CAMR case. Note that, mathematically, this impact is the same as the difference between the third and second run. This report focuses on that difference (iii vs. ii). Appendix A summarizes the full results for all three cases and provides comparison of case ii vs. case i, and case iii vs. case i.

The Illinois Mercury Rule

This study uses the IPM model to determine the impacts of the Illinois mercury rule on coal plants in Illinois. The Illinois rule is summarized as follows:

Phase 1 of the rule begins in July 2009. It requires:

- The plant-wide average emissions of coal units: 75-percent reduction of input mercury or 0.020 lbs Hg/GWh.
- The system-wide average emissions of coal units: 90–percent reduction of input mercury or 0.0080 lbs Hg/GWh.

[1] See Title 35: Environmental Protection, Subtitle B: Air Pollution, Chapter I: Pollution Control Board, Subchapter C: Emission Standards And Limitations For Stationary Sources, Part 225, Control Of Emissions From Large Combustion Sources, Draft 03/03/06, as provided by J. Ross, IEPA.

Phase 2 of the rule begins January 1, 2013:

- Plant-wide average emissions of all coal units: 90-percent reduction of input mercury or 0.0080 lbs/GWh.

Given the short time frame for the modeling exercise, ICF was not able to model the rule exactly as it is summarized in the referenced document. Based on discussions with IEPA, and given the available time for this analysis, we structured the analysis as follows:

- First, it is assumed that Phase I of the rule is initiated at the start of 2009.
- Second, rather than model unit level emission rate limits for existing units, ICF simulated unit level emission *rate limits* based on unit level emissions *caps* calculated by IEPA. For subbituminous units, this cap was based on a 90 reduction in emissions from historic levels. For bituminous plants, the cap reflects the rate limit and a fixed generation level. IPM model plant level emissions caps are the sum of the individual unit caps. Note that using caps to simulate a rate limit is a more restrictive policy. Under a rate limit policy, a unit would be able to increase generation and emissions so long as it remained under the rate. Under a cap, emissions do not increase over time.
- The rate limits that are specified above (i.e., 0.020 or 0.0080) were implemented for all potential coal and potential IGCC units in IPM's MANO region (Illinois capacity consists of 88 percent of MANO region's capacity).
- In addition to the plant level caps implemented across the two phases, a system level emissions limit was imposed that reflected the 90 percent reduction requirements of Phase I. This was calculated based on the 0.008 lbs/GWh emission rate limit. This system cap was applied to all Illinois affected units, which is a less restrictive requirement than the proposed rule.

These scenarios were examined using IPM under the assumptions developed and described in this report. IPM is a capacity planning and dispatch model that simulates the operation of the electric power system based upon engineering and economic fundamentals. It is supported by a detailed set of data and assumptions that characterize the current generation and transmission system; fuel markets; demand; environmental requirements; and system constraints. Additional inputs include new technology (including pollution control equipment) costs, current environmental laws and regulations, and any potential future policies being modeled. More information on IPM is provided in Appendix B.

The results that come from the model are dependent on these input assumptions. The starting point for modeling assumptions the Illinois mercury rule for this study is the EPA IPM Base Case 2004 (v.2.1.9) used for analysis of the Clean Air Rules along with modifications made during previous work for the VISTAS, CENRAP, and LADCO Regional Planning Organizations (RPO). Subsequent to this RPO work, ICF was directed to make additional changes by IEPA, including unit level changes for the Illinois units and modifications to mercury control costs. These changes are described further in Appendix C. The results described herein reflect these assumptions.

Results

This section summarizes the results of the analysis focusing on the incremental impacts of the Illinois rule, as represented by the differences between cases (iii) the Illinois rule described above and (ii) the CAIR/CAMR rules. Additional tables and information are provided in the remainder of this report. Full summaries of all cases are presented in Appendix A.

Table 1-1 shows the changes in emissions for mercury, SO_z and NO_X for Illinois and at the national level. Due to the more stringent nature of the mercury rule in Illinois relative to Illinois' allocations under CAMR, emissions of mercury in Illinois are lower by 4,726 lbs in 2009. This is an 85 percent reduction in Illinois mercury emissions relative to the Base and CAMR Cases.

Emissions levels decrease in Illinois over time under the Illinois mercury rule reflecting increased stringency of the emissions constraints and reduced flexibility in compliance. Emissions in Illinois from all units total 883 lbs in 2009 falling to 799 lbs in 2018. This represents a reduction of 4,726 pounds and 1127 pounds in 2009 and 2018, respectively. Note that under the CAIR/CAMR case, Illinois is a net purchaser of mercury emission allowances in 2018 given that its state budget under CAMR is 1,258 pounds of mercury.

The SO_2 and NO_x emissions in Illinois are also lower under the Illinois rule relative to CAIR/CAMR. This results from reductions in coal-fired generation and an increase in scrubber installations in 2009 as a result of the Illinois rule. The mercury emissions are also lower nation-wide, reflecting the reductions from Illinois units.

Table 1-1
Emissions (thousand Tons or Lbs)

	(iii) Policy Case with IL Rule				(ii) Base Case with CAIR/CAMR				Delta (iii - ii)		
Pollutant	**2009**	**2015**	**2018**		**2009**	**2015**	**2018**		**2009**	**2015**	**2018**
IL State											
Hg [1]	883	789	799		5,609	2,463	1,926		(4,726)	(1,674)	(1,127)
SO_2 (Title IV)	232	212	206		309	268	266		(77)	(56)	(60)
NOx (SIP Call)	63	62	61		67	68	68		(4)	(6)	(7)
National											
Hg [1]	81,822	59,828	56,676		86,201	61,552	57,914		(4,379)	(1,724)	(1,238)
SO_2 (Title IV)	6,725	5,204	4,795		6,765	5,195	4,815		(40)	9	(20)
NOx (SIP Call)	2,514	2,366	2,272		2,516	2,365	2,268		(2)	1	4

1. Mercury emissions are reported in pounds; all other pollutants are reported in short tons.

Table 1-2 shows the changes in generation in Illinois and nationally. The total generation in Illinois is lower by 2 percent in 2009 relative to the CAIR/CAMR case. By 2015 and 2018, total generation has decreased by 7 and 5 percent, respectively, relative to the CAMR case.

This reduction is driven by reductions in coal-fired generation in Illinois. Illinois is a net exporter of energy – that is, it generates more than is required to meet its internal demand. Under the CAMR rule, Illinois coal fired generation is reduced somewhat – by 2 percent in 2009, and 6 percent in 2018. However, under the Illinois mercury rule, the impact is more pronounced with reductions in coal-fired generation in 2009, 2015, and 2018 of 4 percent, 15 percent, and 10 percent, respectively, relative to the CAMR rule. With more stringent regulations in place in Illinois, the Illinois coal plants are less competitive, and thus, have fewer opportunities to export coal-fired generation.

The projected decrease in coal generation is slightly compensated by an increase in generation for the oil and natural gas-fired units in Illinois. However, the bulk of the displaced Illinois generation is made up in the rest of MANO and in neighboring regions. Illinois remains a net exporter, but to a lesser degree. Thus, decreases in generation from Illinois units result in a net decline in exports of energy from the MANO region. Total generation decreases overall at the national level, reflecting marginal changes in losses, pumped storage activity and transmission.

Table 1-2
Generation (GWh)

	(iii) Policy Case with IL Rule				(ii) Base Case with CAIR/CAMR				Delta (iii - ii)		
Generation	**2009**	**2015**	**2018**		**2009**	**2015**	**2018**		**2009**	**2015**	**2018**
IL State											
Coal	102,514	93,733	98,375		107,327	109,692	109,523		(4,813)	(15,958)	(11,148)
Hydro	92	92	92		92	92	92		-	-	-
Nuclear	95,092	95,259	96,575		95,092	95,259	96,575		-	-	-
Oil/Natural Gas	3,693	7,528	8,648		3,367	5,815	7,908		326	1,713	739
Other	166	166	166		166	166	166		-	-	-
Renewables	589	1,097	1,097		589	1,097	1,097		-	-	-
Grand Total	202,146	197,875	204,953		206,633	212,120	215,361		(4,487)	(14,245)	(10,408)
National											
Coal	2,187,043	2,448,517	2,650,066		2,189,406	2,448,364	2,640,484		(2,362)	153	9,582
Hydro	287,113	290,063	288,249		287,218	290,205	289,165		(104)	(142)	(916)
Nuclear	796,715	810,065	807,698		796,715	810,065	807,698		-	-	-
Oil/Natural Gas	889,675	1,023,427	1,063,795		887,468	1,023,775	1,073,736		2,207	(348)	(9,940)
Other	44,066	51,731	49,497		44,066	51,731	49,497		-	-	-
Renewables	81,947	101,232	108,330		81,947	101,178	108,361		-	54	(31)
Grand Total	4,286,560	4,725,036	4,967,636		4,286,820	4,725,318	4,968,941		(260)	(283)	(1,305)

Tables 1-3 shows the impact on total production costs due to the Illinois rule as compared to the CAMR. Production costs shown are the total going forward costs for meeting electricity demand, including fuel, VOM costs, FOM costs, and annualized capital costs (including costs for new capacity and retrofits). As can be seen, the total costs at the national level are higher under the Illinois rule by $147 to $267 million per year over the time frame analyzed. These are very small impacts relative to total national costs (about two-tenths of a percent).

In Illinois, production costs are higher in 2009, by about half the national level ($68 million). This reflects a mix of increased capital costs and variable O&M due to additional controls required, partially offset by displaced fuel consumption from lost generation.
In later years under Phase II of the Illinois rule, production costs are *lower* in all years (by $188 and $53 million, in 2015 and 2018, respectively). This reduction in costs reflects the lower level of generation that occurs in Illinois due to the rule (which is down by between 5-7 percent in these years), offset by increased cost of retrofit decisions. Capital costs are up in these years; however, these costs are offset by the reduced fuel and net decreases in VOM costs.

Note that these costs are production costs and do not reflect the opportunity costs (i.e., lost revenues and associated profits) of the lost exports. Generation in Illinois is sufficient to meet internal load and export power to neighboring regions (this assumes that Illinois generators share proportionally in the exports). Under the Illinois mercury rule, this remains true; however, the level of exports declines, with attendant loss of revenues from these sales. We have not quantified these lost revenues.

Table 1-3
Total Production Costs (1999 million dollars) Impacts of the Illinois Rule

	(iii) Policy Case with IL Rule				(ii) Base Case with CAIR/CAMR				Delta (iii - ii)		
Plant Type	**2009**	**2015**	**2018**		**2009**	**2015**	**2018**		**2009**	**2015**	**2018**
IL State											
Variable O&M	357	340	355		306	372	382		51	(32)	(27)
Fixed O&M	2,030	2,137	2,316		2,003	2,134	2,300		28	3	16
Fuel Total	1,931	1,908	1,963		1,995	2,069	2,102		(63)	(162)	(140)
Capital	84	105	295		32	101	198		53	3	97
Total Cost	4,403	4,488	4,929		4,335	4,676	4,982		68	(188)	(53)
National											
Variable O&M	7835	9495	10549		7780	9496	10511		56	(2)	38
Fixed O&M	28926	31772	33432		28910	31749	33388		16	23	44
Fuel Total	61818	65527	68945		61759	65480	69139		59	47	(194)
Capital	2574	13256	19167		2558	13057	18807		16	199	360
Total Cost	101,153	120,049	132,094		101007	119782	131846		147	267	248

Table 1-4 shows the changes in total costs, generation, and average production costs in Illinois and nationally under the two policy cases. Despite lower overall production costs in Illinois (due to lower generation levels), average production costs increase because of the mercury rule. They increase by $0.80 per MWh in 2009, $0.64 per MWh in 2015, and $0.92 per MWh in 2018. Thus, average production costs in Illinois increase by 4 percent, 3 percent, and 4 percent in 2009, 2015 and 2018, respectively. The increase at the national level is minimal (less than two-tenths of a percent) in all years.

The decrease in <u>total</u> costs in Illinois is a result of the decrease in generation levels from Illinois units offset by increased costs for compliance. In these years, these reductions outweigh the increase in production costs due to the mercury rule. Though the decrease in generation leads to a decrease in the exports of energy, the MANO region is still a net exporter of energy. However, the region must import capacity in order to meet summer peak reserve requirements,

Table 1-4
Total Costs (Millions of $) and Average Production Costs (1999 $/MWh)

	(iii) Policy Case with IL Rule				(ii) Base Case with CAIR/CAMR				Delta (iii - ii)		
Plant Type	**2009**	**2015**	**2018**		**2009**	**2015**	**2018**		**2009**	**2015**	**2018**
IL State											
Total Costs (MM$)	4,403	4,488	4,929		4,335	4,676	4,982		68	(188)	(53)
Total Generation (GWh)	202,146	197,875	204,953		206,633	212,120	215,361		(4,487)	(14,245)	(10,408)
Average Costs ($/MWh)	21.78	22.68	24.05		20.98	22.04	23.13		0.80	0.64	0.92
National											
Total Costs (MM$)	101,153	120,049	132,094		101,007	119,782	131,846		147	267	248
Total Generation (GWh)	4,286,560	4,725,036	4,967,636		4,286,820	4,725,318	4,968,941		(260)	(283)	(1,305)
Average Costs ($/MWh)	23.60	25.41	26.59		23.56	25.35	26.53		0.04	0.06	0.06

Table 1-5 shows the changes in firm wholesale electricity prices. The firm price is made of two components: marginal energy and marginal capacity prices. Firm prices in Illinois increase by $0.50/MWh in 2009, by $1.46/MWh in 2015, and $1.00/MWh in 2018. Marginal energy prices reflect the production costs of the marginal plant – the last plant to be dispatched in each hour. The mercury rule causes an increase in production costs and increases the costs of the marginal unit, and thus increases the marginal energy prices over CAMR levels. This in turn leads to higher firm prices for all the years. The rule has a negligible impact on firm electricity prices nation-wide -- $0.07-0.15/MWh across the study horizon.

Table 1-5
Wholesale Firm Electricity Price (1999 $/MWh)

	(iii) Policy Case with IL Rule				(ii) Base Case with CAIR/CAMR				Delta (iii - ii)		
Region	**2009**	**2015**	**2018**		**2009**	**2015**	**2018**		**2009**	**2015**	**2018**
IL (MANO)	27.40	41.08	50.29		26.90	39.62	49.29		0.50	1.46	1.00
National	37.73	39.33	45.45		37.66	39.23	45.31		0.07	0.10	0.14

** The firm wholesale price represents the sum of marginal energy costs and marginal capacity price, spread across all generation. The prices are energy weighted segmental prices.
** Wholesale marginal energy and capacity prices in IPM are forecast at the IPM model region level for each run-year, season, and segment. The wholesale prices for MANO are presented as representative of Illinois.

IPM is a wholesale power market model. As such, its outputs include estimates of increased generation system costs (and hence average cost increases) and impacts on marginal energy and capacity costs. It does not provide projections of retail rates or retail price impacts. Therefore, it is necessary to estimate retail rate impacts based on the available outputs of the model.

Final retail rates depend on the nature of the market in each state (deregulated or not) and the ratemaking process, including how cost increases are allocated among sectors, what returns are ultimately allowed, among a host of other factors. In Illinois, an auction process was recently established that allows for the procurement of electricity at wholesale by Ameren and ComEd for delivery to Illinois retail consumers requiring supply service from their local distribution utility beginning in 2007.

The estimate of retail rate impacts estimated here reflects an assumption that retail rates over the study horizon would increase by the increase in wholesale energy prices. Given the competitive nature of wholesale markets in Illinois, this is not an unreasonable assumption.

A number of other inputs and assumptions are required to calculate the retail rate impact. It is assumed that the increase is applied equally across all sectors – that is, all sectors bear the same incremental per kWh wholesale cost increases. Second, a forecast of baseline retail rates is required to which to add this increase. For this purpose, we obtained from the DOE's Energy Information Agency's (EIA) Annual Energy Outlook (AEO) 2006 a forecast of sectoral retail electricity rates over the study horizon for the MAIN (Mid-America Interconnected Network) region. The underlying assumption is that forecast retail rates for MAIN are applicable to the state of Illinois. The AEO 2006 scenario from which this rate is taken is comparable to the CAIR/CAMR rule in that those two rules are assumed to be in place in the AEO analysis. However, it is important to note that the two cases may differ on other aspects.

Table 1-6 shows the changes in retail electricity prices by sector. We calculated the retail electricity prices by applying the IPM projected increase in firm wholesale electricity prices resulting from the Illinois rule to the retail sectoral rates obtained from AEO 2006 (adjusted to be consistent year dollars). The policy causes an increase in the production costs and thus energy prices. This in turn leads to higher retail prices for all the sectors.

Price increases range from 0.05 cents per kWh to 0.15 cents per kWh over the study horizon. These represent increases of one to two percent in the residential and industrial sectors and one to 3.5 percent in the commercial sector. Under this methodology, increases in the commercial and industrial sectors are proportionately higher given the lower starting base rates.

Tables 1-6
Estimated Impacts on Retail Electricity Prices in Illinois
(1999 cents per kWh)*

	(iii) Policy Case with IL Rule			(ii) Base Case with CAIR/CAMR			Delta (iii - ii)		
Region	**2009**	**2015**	**2018**	**2009**	**2015**	**2018**	**2009**	**2015**	**2018**
IL State									
Residential	7.43	7.67	7.75	7.38	7.52	7.65	0.05	0.15	0.10
Industrial	6.50	6.50	6.65	6.44	6.35	6.55	0.05	0.15	0.10
Commercial	4.58	4.32	4.45	4.53	4.17	4.35	0.05	0.15	0.10

*Retail prices are estimated by adding the incremental increase in Firm Wholesale Electricity Prices (shown in Table 1-5) between the cases to the retail prices by sector. Retail prices by sector were obtained from EIA's AEO 2006 data. Refer to Table 62: Electric Power Projections by EMM region". Data for the "MAIN" region was used to estimate prices for the Illinois state.

Tables 1-7 and 1-8 show the changes in total expenditures for each sector on an annual and monthly basis. In 2009, residential customer expenditures increase by $28 million; industrial expenditures for electricity increase by $31 million while commercial expenditures increase by $27 million. In 2015, increased expenditures total $87, $101, and $83 million for the residential, commercial, and industrial sectors, respectively. On a monthly basis, the average household will pay $0.49, $1.50 and $1.06 more in 2009, 2015 and 2018, respectively, as a result of incremental impact of the Illinois mercury rule. These numbers are the increase in monthly expenditures in the residential sector in Table 1-8 divided by the number of households in Illinois. The number of households in Illinois was estimated based on forecasts of total population and an estimate of current persons per households, based on Census data.

Tables 1-7
Total Expenditures for Electricity by Sector (1999 million dollars)

	(iii) Policy Case with IL Rule			(ii) Base Case with CAIR/CAMR			Delta (iii - ii)		
Region	**2009**	**2015**	**2018**	**2009**	**2015**	**2018**	**2009**	**2015**	**2018**
IL State									
Residential	4,109	4,569	4,786	4,081	4,482	4,724	28	87	62
Industrial	4,038	4,482	4,848	4,007	4,382	4,775	31	101	73
Commercial	2,488	2,449	2,570	2,461	2,366	2,512	27	83	58

Total bill payments for each sector are calculated as follows. First, an estimate of sales to each sector in Illinois is made based the AEO 2006 projections of each sector's share of total retail sales (for the MAIN region). For example, if AEO projects that in 2010 residential customers will account for x percent of total retail electricity sales, we assume the same share. We estimate Illinois sales based on the assumption that Illinois sales as a proportion of total Illinois generation are the same as that of the MANO region. Finally, the retail prices estimated in Table 1-6 are multiplied by generation to derive total annual expenditures for electricity by sector.

Table 1-8
Impacts on Monthly Expenditures for Electricity by Sector
(1999 million dollars)

	(iii) Policy Case with IL Rule			(ii) Base Case with CAIR/CAMR			Delta (iii - ii)		
Region	**2009**	**2015**	**2018**	**2009**	**2015**	**2018**	**2009**	**2015**	**2018**
IL State									
Residential	342	381	399	340	374	394	2	7	5
Industrial	336	374	404	334	365	398	3	8	6
Commercial	207	204	214	205	197	209	2	7	5

These costs are calculated by dividing the annual payments in 1-7 by 12.

Table 1-9 shows the changes in control technology retrofits between the two policy cases. The proposed mercury rule in Illinois requires an additional 11 GW of ACI controls and 2 GW of FGD controls by 2009. The incremental level of retrofits required by the Illinois rule shrinks by 2018 as the difference between the stringency of the Illinois and CAMR rule shrinks. By 2018, the level of scrubber retrofits required is *lower* than that predicted under CAIR/CAMR, and the least-cost response to the Illinois rule is to add some scrubbers earlier. Similarly, for ACI, the least-cost response is to add about 8 GW of ACI earlier than would be the case under CAIR/CAMR. By 2018, the incremental level of ACI retrofits in Illinois is 2 GW. Note that incremental ACI retrofits occur in the rest of the nation (an additional 1.5 GW by 2015). This is due to the increased level of generation in the rest of the nation that makes up for lost exports from Illinois.

Table 1-9
Control Technology Retrofits (Cumulative MW)

	(iii) Policy Case with IL Rule				(ii) Base Case with CAIR/CAMR				Delta (iii - ii)		
Technology	**2009**	**2015**	**2018**		**2009**	**2015**	**2018**		**2009**	**2015**	**2018**
IL State											
FGD	2,556	2,762	2,762		387	2,836	2,836		2,168	(74)	(74)
SCR	1,748	1,826	1,826		1,799	2,121	2,121		(51)	(295)	(295)
SNCR	-	-	-		-	-	-		-	-	-
ACI	10,590	10,727	11,023		-	7,185	8,498		10,590	3,542	2,525
National											
FGD	38,578	72,100	85,019		36,948	73,530	85,543		1,630	(1,431)	(525)
SCR	34,362	51,042	64,747		34,223	51,213	65,181		139	(171)	(434)
SNCR	2,039	2,575	2,925		2,041	2,578	3,106		(3)	(3)	(181)
ACI	18,493	63,788	72,423		7,934	58,723	67,672		10,559	5,065	4,751

Table 1-10 summarizes the changes in coal consumption between the two cases. It also provides a full comparison of the Illinois rule vs. a Base Case without CAIR/CAMR (second section of the table), and the CAIR /CAMR vs. a case with neither rule in place (third section).

Under CAIR/CAMR, bituminous coal consumption falls by about 18 to 68 TBtu (or about 8 to 24 percent over the study horizon). Under the Illinois Rule, bituminous fuel consumption rises by 48 TBtu in 2009. It falls slightly in 2018 (18 TBtu or 10 percent) under the Illinois rule, but by a much lesser amount than under CAIR. Hence, relative to CAMR, the proposed mercury rule in Illinois leads to an increase in use of bituminous coal and a decrease in the use of subbituminous coal in Illinois units. This reflects the incremental use of scrubbers in early years. These decreases in subbituminous coal consumption are substantially offset by increases in the rest of the nation. Coal prices are not affected by the Illinois rule.

Table 1-10
Coal Consumption (TBtu)

Comparison of Two Policy Cases										
	(iii) Policy Case with IL Rule				(ii) Base Case with CAIR/CAMR				Delta (iii - ii)	
Coal Type	2009	2015	2018		2009	2015	2018		2009	2015	2018
IL State										
Bituminous	268	254	262		201	214	212		67	40	50
Subbituminous	808	728	751		924	942	942		(116)	(214)	(191)
Lignite	-	-	-		-	-	-		-	-	-
Total	1,077	982	1,013		1,126	1,156	1,154		(49)	(174)	(141)
National										
Bituminous	12,940	14,114	15,153		12,945	14,070	15,068		(5)	44	86
Subbituminous	8,990	9,995	10,680		8,990	10,053	10,701		-	(58)	(21)
Lignite	774	774	774		792	792	792		(18)	(18)	(18)
Total	22,704	24,882	26,607		22,727	24,915	26,560		(23)	(32)	47
Impact of the Illinois Rule										
	(iii) Policy Case with IL Rule				(i) Base Case without CAIR/CAMR				Delta (iii - i)	
IL State										
Bituminous	268	254	262		220	243	280		48	11	(18)
Subbituminous	808	728	751		920	938	936		(112)	(211)	(185)
Lignite	-	-	-		-	-	-		-	-	-
Total	1,077	982	1,013		1,140	1,181	1,215		(63)	(200)	(202)
National										
Bituminous	12,940	14,114	15,153		13,117	13,570	14,418		(177)	544	735
Subbituminous	8,990	9,995	10,680		8,989	10,813	11,683		1	(818)	(1,003)
Lignite	774	774	774		801	801	801		(27)	(27)	(27)
Total	22,704	24,882	26,607		22,908	25,184	26,902		(203)	(302)	(295)
Impact of CAIR/CAMR										
	(ii) Base Case with CAIR/CAMR				(i) Base Case without CAIR/CAMR				Delta (ii - i)	
IL State										
Bituminous	201	214	212		220	243	280		(18)	(29)	(68)
Subbituminous	924	942	942		920	938	936		4	3	6
Lignite	-	-	-		-	-	-		-	-	-
Total	1,126	1,156	1,154		1,140	1,181	1,215		(14)	(26)	(62)
National										
Bituminous	12,945	14,070	15,068		13,117	13,570	14,418		(172)	500	650
Subbituminous	8,990	10,053	10,701		8,989	10,813	11,683		1	(760)	(981)
Lignite	792	792	792		801	801	801		(10)	(10)	(10)
Total	22,727	24,915	26,560		22,908	25,184	26,902		(180)	(269)	(341)

Table 1-11 summarized coal plant retirements resulting from the rule. IPM retires units when it is uneconomic for them to continue operation, in comparison to the alternatives of running existing units harder, building new units, and when considering whether their continued operation is required for reserve margin purposes. This decision reflects the situation over the entire study horizon. Relative to the CAIR/CAMR, the proposed rule causes a small amount of coal-fired capacity to be uneconomic and thus retire (252 MW). These plants are Hutsonville Units 5 and 6 (partial) and Meredosia Units 1-4. These units are currently 50 years old or older. In practice, units that become uneconomic when the rule takes effect may be "mothballed" until fuel prices or other conditions change, they may retire, or kept in service for grid reliability purposes.

Table 1-11
Cumulative Coal Plant Retirements (MW)

	(iii) Policy Case with IL Rule			(ii) Base Case with CAIR/CAMR			Delta (iii - ii)		
Plant Type	**2009**	**2015**	**2018**	**2009**	**2015**	**2018**	**2009**	**2015**	**2018**
IL State									
Coal	597	597	597	345	345	345	252	252	252
National									
Coal	2,085	2,788	2,788	1,880	2,585	2,585	205	203	203

* Retirement figures are cumulative.

Conclusions

The principal findings of this study are:

- The mercury rule reduces coal-fired generation in Illinois by 15 percent in 2015 (7 percent reduction in total generation). This generation lowers exports to neighboring regions.
- Total production cost in the region increase by about 2 percent in the first year of the policy. However, in subsequent years, costs fall as exports fall and associated production costs offset compliance costs increases. This also implies that revenues from exports fall.
- Average production costs in Illinois increase by 2 to 3 percent as a result of the rule. Marginal prices increase by 2 to 4 percent across the study period.
- Mercury emissions drop to 883 pounds of mercury by 2009, 84 percent below levels under the CAMR. By 2018, they fall to 799 pounds, 58 percent below CAMR levels.
- The retail electricity prices and expenditures across all sectors (residential, industrial and commercial) are higher as a result of the rule relative to the CAMR, but by only a small percentage – 1 to 3.5 percent over the study horizon. On an average bill basis, residential customers pay less than $1.50 per month more under the Illinois rule relative to CAMR across the study horizon.