Evolution Of The Revolution:

The Sustained Success Of Retail Electricity Competition

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After more than a century of a universally accepted vertical monopoly model, the idea of retail electricity competition ("Customer Choice") that emerged in the 1980s was indeed revolutionary. To succeed, a revolutionary idea must evolve to reflect changed conditions and lessons learned. Measured against objective criteria over almost two decades, Customer Choice has met that test.

At the outset, Customer Choice opponents claimed retail electricity competition would increase prices and price volatility and decrease generation investment and electric reliability. The empirical data demolish those claims, showing instead that, whenever allowed, consumers enthusiastically embrace Customer Choice:

- Customer Choice is thriving in 13 states and the District of Columbia, which have full access ("Customer Choice Jurisdictions").
- From 2003 to 2013, in the 14 Customer Choice Jurisdictions, accounts served with supply from competitive suppliers rather than with power supply from local delivery utilities, **grew by 524% for Commercial and Industrial ("C&I") customers and 636% for residential**, totaling 19 million customer accounts by year-end 2013.
- From 2003-2014, in the 14 Customer Choice Jurisdictions **electrical load served by competitive suppliers grew dramatically even in an era of overall flat growth in electricity consumption: 181% for C&I and 673% for residential** – accounting for 20 of every 100 kilowatt hours sold in the contiguous United States.
- Competition era price trends in the Customer Choice Jurisdictions have been more favorable to customers than price trends in the 35 traditional monopoly regulation jurisdictions ("Monopoly States"), with **average electricity prices falling against inflation in Customer Choice Jurisdictions, but far exceeding inflation in Monopoly States.**
- Customer Choice Jurisdictions, as a group, have outperformed Monopoly States in generation, attracting billions of dollars of investment in new, more efficient generation, **resulting in higher capacity factors than in Monopoly States** and parity in resource adequacy to meet load.
- The five states of the Industrial Upper Midwest offer a compelling intra-regional example of the success of Customer Choice, with the competitive states Illinois and Ohio outperforming the Monopoly States of Indiana, Michigan and Wisconsin with lower price trends and greater generation efficiency.

The data sources for this report are DNV GL (choice accounts and volumes) and the U.S. Energy Information Administration (prices, generation and consumption volumes)[1].

MEASURING CUSTOMER CHOICE

For nearly two decades, two retail electricity models (choice and monopoly), have operated in parallel in the United States[2], thus allowing reliable comparison of the two models on key indicators.

The data demonstrate that the 14 Customer Choice Jurisdictions, which steadily adapted and expanded retail choice, compare favorably with, or outperform, the 35 Monopoly States which have so far rejected broad-based customer market access[3]. There has been sustained growth of Customer Choice both in number of accounts and electric load served by competitive providers. There has been substantial investment in generation and favorable generation performance trends in Customer Choice Jurisdictions. And price trends under Customer Choice have been more favorable to customers than in Monopoly States.

As shown in Figure 1, the 14 Customer Choice Jurisdictions[4], which account for 1.2 Billion MWh in total annual consumption or 33% of contiguous U.S. electrical load, is concentrated in the northeastern quadrant of the country, with the notable exception of Texas.[5]

FIGURE 1: THE 14 CUSTOMER CHOICE JURISDICTIONS: 1.2 BILLION MWH = 33% OF U.S.

The 35 Monopoly States include five that in 2014 allowed only highly restricted Customer Choice, and two states that previously allowed restricted choice.[6] Comparative analysis of performance differences between the 14 Customer Choice Jurisdictions and the 35 Monopoly States would not be materially affected by treating these seven states separately. Moreover, as these seven states severely limit (or only briefly allowed) retail competition, their performance has been much more similar to that of the 28 Monopoly States that never allowed any retail choice than to performance of the Customer Choice Jurisdictions.[7]

When Allowed, Customers Embrace Choice

19 Million Competitive Supplier Customer Accounts[8]

By 2003, most of the 14 Customer Choice Jurisdictions had established the regulatory framework for retail electricity competition. For example, they had addressed significant legacy issues such as stranded costs; promulgated unbundled traditionally regulated delivery tarrifs; developed default supply service (provider of last resort–POLR) rates; clarified switching rules; and implemented electronic data interchange standards for competitive suppliers and utilities. In these jurisdictions, retail competition continued to expand as competitive suppliers and customers rapidly gained experience, wholesale markets adapted and regional transmission organizations ("RTOs") developed. Because of the significance of 2003, it is an appropriate year from which to measure year-to-year change.

At year-end 2013[9], competitive suppliers served more than 19 million customer accounts in the 14 Customer Choice Jurisdictions, which include some of the most economically important states in the country as well as the seat of national government.

The number of competitive supplier customer accounts in the 14 Customer Choice Jurisdictions increased dramatically between 2003 and 2013, growing by 16.4 million, a 617% increase.[10] As shown in Figures 2a and 2b, competitive residential accounts grew by 14.1 million or 636%, and C&I by 2.3 million or 524%. These increases represent average annual compounded growth rates of 19.9% for residential and 18.1% for C&I. Once full-year 2014 figures are available, accounts served by competitive suppliers likely will exceed 20 million.

FIGURE 2a: RESIDENTIAL CUSTOMER CHOICE ACCOUNTS: 14.1 MILLION, 636% INCREASE 2003-13

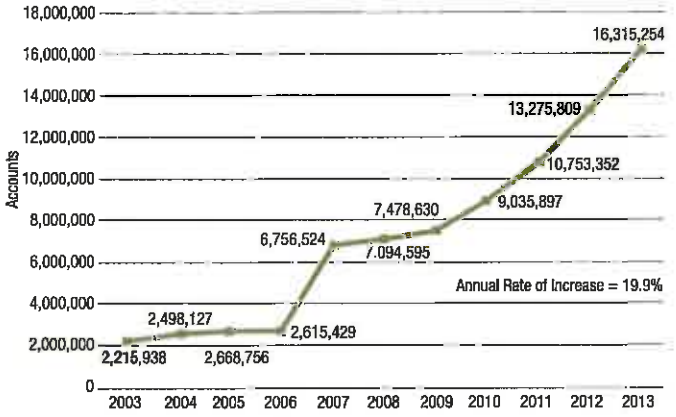
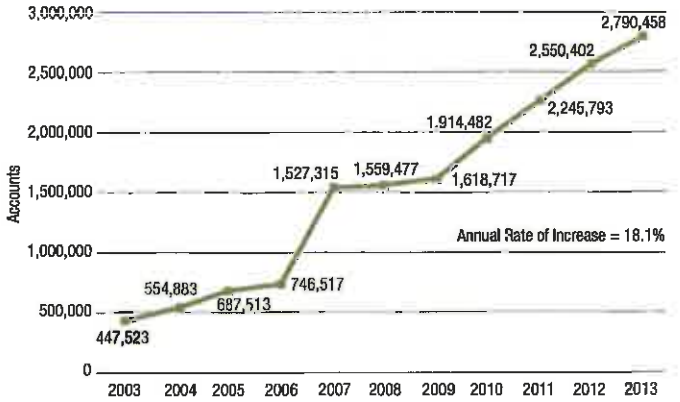


FIGURE 2b: C&I CUSTOMER CHOICE ACCOUNTS: 2.3 MILLION, 524% INCREASE 2003-13

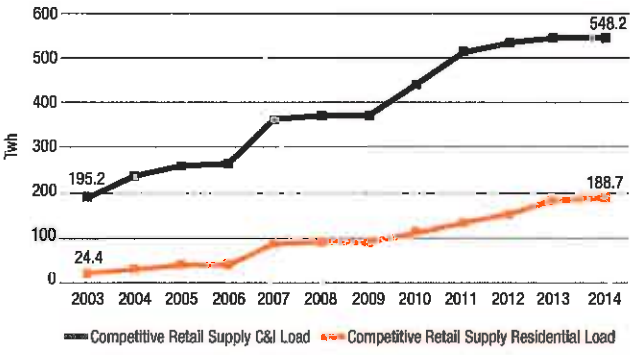


The Customer Choice Power Surge

In 2014 in the 14 Customer Choice Jurisdictions, competitive suppliers served 737 million MWh of load, an increase of 235% from 220 million MWh in 2003.[11] As shown in Figure 3, load growth has not been confined to C&I, rather government, non-profit and residential customers have also opted for choice of supplier and market pricing and product diversity not available under traditional monopoly tariffs. From 2003 to 2014, residential load served by competitive suppliers in the 14 Customer Choice Jurisdictions grew 673%, from 24 million MWh to 189 million MWh, as competitive C&I volume grew by 181%, from 195 million MWh to 548 million MWh.

FIGURE 3: CUSTOMER CHOICE LOAD SURGE: 2003-2014

RESIDENTIAL: 165 MILLION MWH, 673% INCREASE
C&I: 353 MILLION MWH, 181% INCREASE

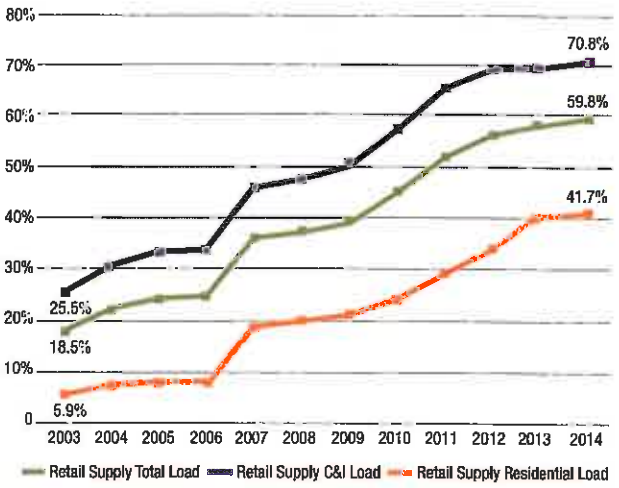


Competitive Suppliers Serve 60% of Load in Choice Jurisdictions = 20% of National Load

In 2014, competitive suppliers directly served nearly 60% of the total load of more than 1.2 billion MWh in the 14 Customer Choice Jurisdictions. Most of the other 40% of load was served by utilities with market priced supplies obtained through competitive procurement overseen by state regulators.[12]

Figure 4 shows that in the 14 Customer Choice Jurisdictions customer total load served by competitive providers more than tripled, growing from just 18.5% of total load in 2003 to 59.8% in 2014. C&I load served by competitive providers grew from 25.5% to 70.8% and the residential share from 5.9% to 41.7%. For all the 48 contiguous states and the District of Columbia, these volumes translate into 20% of total load, 24% of all C&I load and 13.5% of all residential. These increasing volumes of competitive supply underscore the success of Customer Choice in becoming a substantial and sustainable feature of the American electricity landscape.

FIGURE 4: PERCENTAGE OF LOAD IN 14 CUSTOMER CHOICE JURISDICTIONS SERVED BY COMPETITIVE SUPPLIERS



Customer Choice Has Even Gained Market Share in a Flat Electricity Sector

One key measure of the vitality of Customer Choice is its ability to grow and increase market share even though overall electricity demand has been flat or declining. By that measure as well, Customer Choice is a stunning success.

A central feature of the electricity industry in the United States in recent years has been low average annual growth in grid-delivered supply. Since 1997, total retail load in the 48 contiguous U.S. states and the District of Columbia grew by 18.5%. However, this compounded average growth rate of less than 1% yearly over 17 years does not tell the full story. The growth in electricity consumption has been decelerating in each successive period since 1997, finally flatlining after 2008. Figure 5 shows the radically different growth trends in continental U.S. electricity consumption and in competitive load in the 14 Customer Choice Jurisdictions within that otherwise flat sector.

FIGURE 5: 1997–2014 LOAD GROWTH IN 14 CUSTOMER CHOICE JURISDICTIONS COMPARED TO OVERALL LOAD GROWTH IN THE CONTIGUOUS UNITED STATES

% Change U.S. Total MWH	% Change	Competitive Supplier Served Load
1997–2003 (6 years)	11.1%	From Near-Zero to 220 Million MWH
1997–2014 (17 years)	18.5%	From Near-Zero to 737 Million MWH
2003–2008 (5 years)	6.9%	110.3%
2003–2014 (11 years)	6.7%	235.6%
2008–2014 (6 years)	–1.4%	59.6%

Measuring Price Performance

Opponents of Customer Choice attack competition by highlighting that average electricity prices for the Customer Choice Jurisdictions exceed those for the Monopoly States. This misplaced criticism ignores a basic reality. Long before retail competition commenced, the weighted average price of electricity in the 14 Customer Choice Jurisdictions was higher than in the Monopoly States. In New England and the Mid-Atlantic States in particular, urbanization, long distances from fuel sources, high wage and tax levels and more restrictive environmental rules had produced higher underlying cost structures and higher prices than in most states in other regions. In the 1970s and 1980s, large power plant construction programs in a period of historically high combined inflation and interest rates and increasing nuclear regulations further exacerbated these longstanding higher price structures, precipitating the move to competition.

The proper focus, therefore, is not a snapshot of electricity prices but rather is a comparison between price trends in the Customer Choice Jurisdictions and the Monopoly States during the competitive era. Further, the comparison of price trends between the two groups of states should be considered on a standardized basis.

First, when comparing price changes between the two groups of states, average weighted prices should be used so as to remove the distortions associated with straight averages which fail to account for the significantly different volumes of sales in large and small states that may have quite different price levels.[13]

Second, price trends in the two groups of states ought to be analyzed on the basis of percentage changes in prices so as to remove the impact of initial prices. This allows for a better understanding of price performance in the period after the variable in question – ie. the form of regulation – has been differentiated between the two groups.

Third, adjusting for inflation removes the distorting impact of increased nominal gaps that may actually constitute smaller gaps on a percentage basis.

Under these proper and valid measures, the Customer Choice Jurisdictions have significantly outperformed the Monopoly States when compared as groups. When comparing a few individual states within a single region, however, such as the five similar states in the Industrial Upper Midwest, nominal prices are a more appropriate measure.

Prices in Customer Choice Jurisdictions Have Risen at Lower Percentage Rates Than in Monopoly States

Percentage increases in average weighted prices in the 14 Customer Choice Jurisdictions have been far lower than in the 35 Monopoly States as shown in Figures 6 through 9. Favorable price performance under choice has benefitted all customer classes, contrary to opponents' claims that competition would benefit C&I customers to the detriment of residential customers.

Between 1997 and 2014, all-sector nominal weighted average prices in Customer Choice Jurisdictions rose by 41%, but rose by 60% in the Monopoly States (Figure 6).

When nominal prices are adjusted for inflation, average prices in the Customer Choice Jurisdictions fell against inflation, whereas prices in the Monopoly States rose at a rate higher than inflation[14] (Figure 7).

Between 2003 and 2014, all-sector nominal weighted average prices in the Customer Choice Jurisdictions rose 34% compared to 44% in the Monopoly States (Figure 8).

While all-sector average prices in both groups rose more quickly than general inflation, prices in Monopoly States rose at a premium to inflation three times greater than did prices in the Customer Choice group (Figure 9).

Overall, electricity in the Monopoly States accounts for a larger share of consumer cost of living in 2014 than in 1997, whereas in the Consumer Choice Jurisdictions electricity's share of the consumer pocketbook was less in 2014 than in 1997.

FIGURE 6: % CHANGE 1997–2014 AVERAGE WEIGHTED PRICES: CHOICE vs MONOPOLY

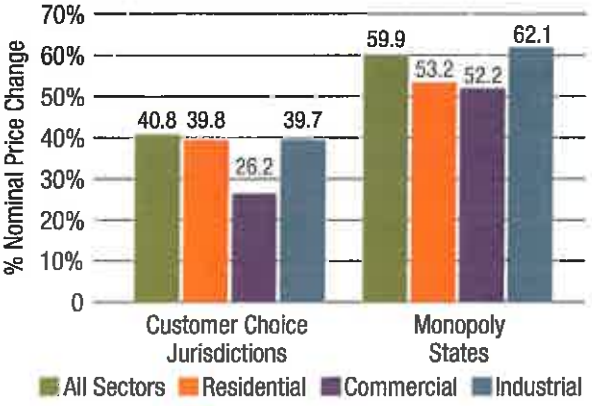


FIGURE 7: INFLATION ADJUSTED % PRICE CHANGE 1997–2014: CHOICE vs MONOPOLY

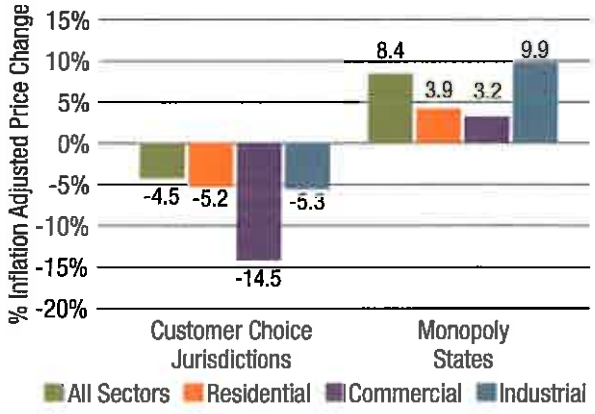


FIGURE 8: 2003–2014 % CHANGE AVERAGE WEIGHTED PRICES: CHOICE vs MONOPOLY

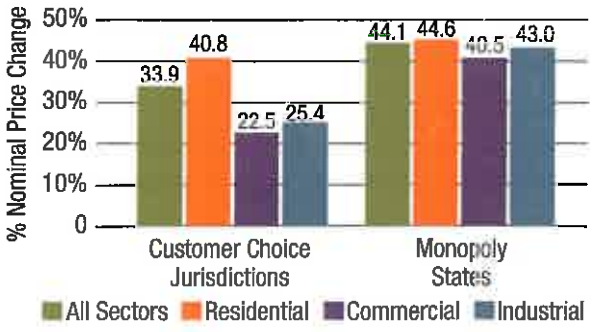
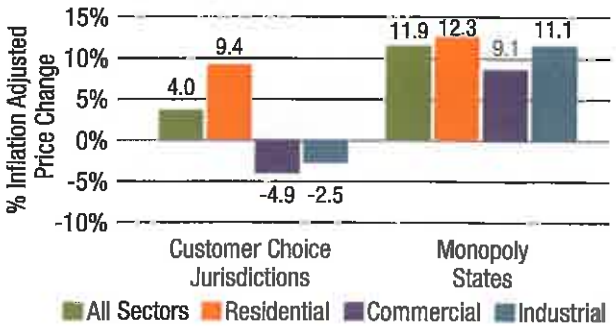


FIGURE 9: INFLATION ADJUSTED % PRICE CHANGE 2003–2014: CHOICE vs MONOPOLY

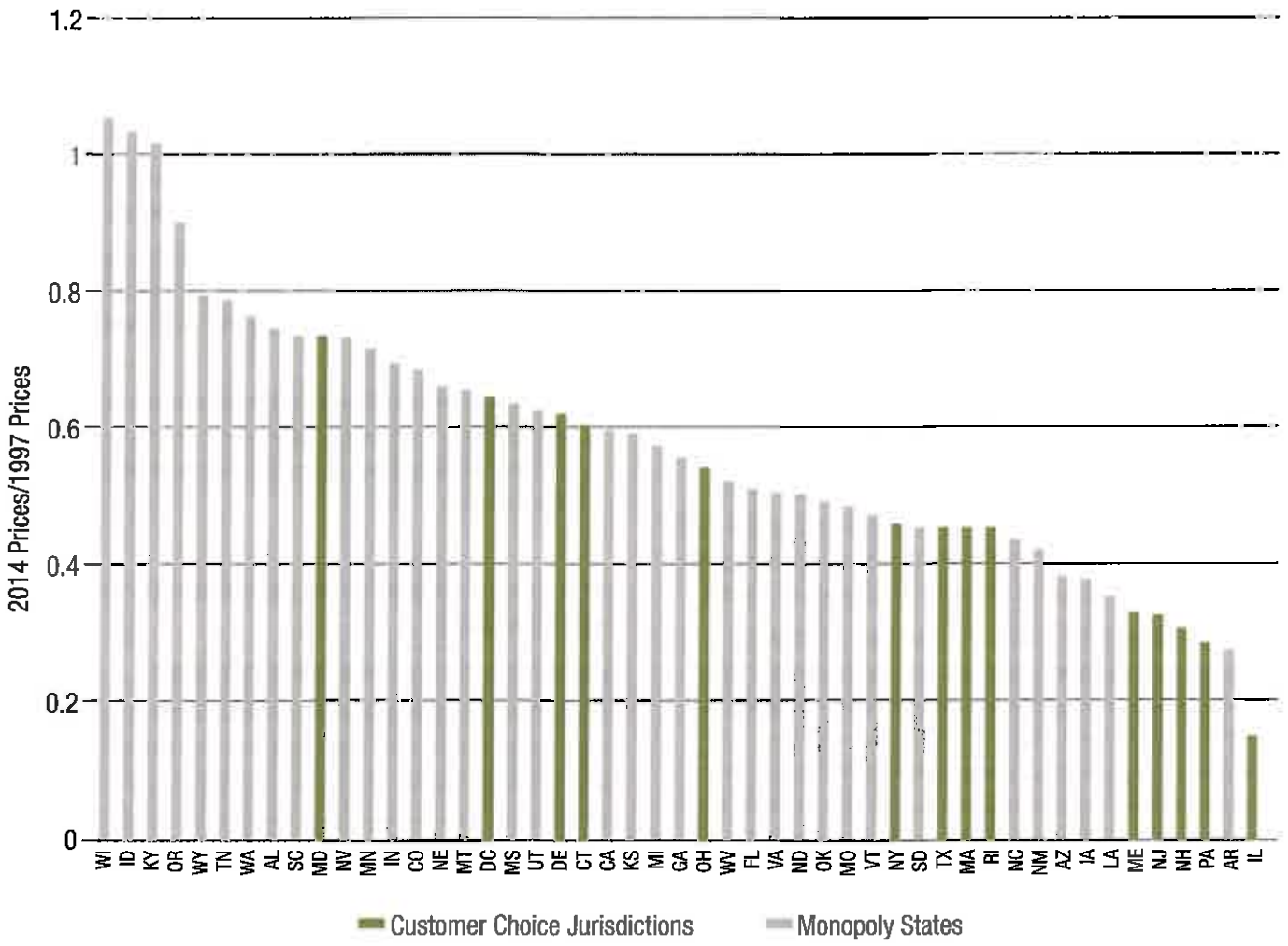


Customer Choice Jurisdictions Cluster in the Lower Half of Price Increases From 1997-2014

Notably, the lower percentage price increases in the Customer Choice Jurisdictions are not the result of large aberrational price reductions in just a few competitive states or of disproportionate price increases in a few large Monopoly States. Nor is the difference in price trends a function of using weighted average prices rather than straight average prices.[15]

Figure 10 shows the 48 contiguous U.S. states and DC ranked by percentage increase in all-sector nominal average price between 1997 and 2014. Ten of the 14 Customer Choice Jurisdictions are in the lower half of the distribution and nine are in the lower third. Most significantly, five Customer Choice Jurisdictions comprise the lowest six. Three of the four Customer Choice Jurisdictions in the upper half of the distribution (Maryland (10th), District of Columbia (17th) and Delaware (21st)) are in a shared footprint with longstanding transmission constraints which inhibit the flow of lower-priced resources from the west.[16]

FIGURE 10 : RANKING OF % INCREASE IN NOMINAL ALL-SECTOR AVERAGE PRICE 1997–2014



Price Signals: Competitive Retail Prices Respond to Market Conditions

In addition to moderating disadvantageous upward price trends, another price goal of electricity competition was to remedy traditional regulation's inability to set generation prices that reflected supply and demand realities.[17] The price data confirm that competition has met this second goal as well.

Monopoly advocates often argue that competitive prices that reflect economic conditions disadvantage consumers and that electricity prices should instead be set administratively. Competitive electricity markets provide price signals through multi-year forward pricing and in real-time or other short-term prices. In marked contrast, traditional monopoly regulation administratively sets essentially backward looking prices based primarily on sunk costs and intra-class uniform pricing. Economics and market realities drive competitive pricing; regulatory accounting and pricing principles established in far different conditions many decades ago drive monopoly regulation.

Competition opponents also assert that market-responsive price signals in the Customer Choice Jurisdictions would yield more volatile monthly retail prices compared to prices under traditional monopoly regulation. Actual experience also shows this assertion to be unfounded.[18]

The central problem with the traditional model of monopoly electricity pricing in a future characterized by low growth is that it inevitably results in higher per unit prices on shrinking sales volumes in order to cover fixed generation costs. This is the conundrum at the heart of

the much-discussed "utility death spiral." During the early period of customer choice implementation, 1997-2003, transition rules provided stranded cost compensation for utilities and froze rates for several years for many residential and small business customers, and natural gas prices were low.

During much of the middle period, 2004-2009, the economy was booming and natural gas prices peaked in 2008 at an average city-gate price of $9.18 per mmBtu, well more than double the $4.12 price in 2002.[19]

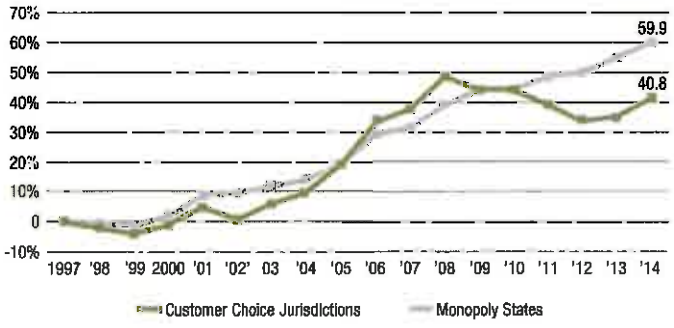
In the later period, 2010-2014, electricity prices fell after the market collapse in late 2008 as expired electricity contracts were replaced during the recession and continuing economic weakness. Average city-gate gas prices in 2012, for example, were about half the 2008 peak period price.

Notably, average weighted retail electricity prices in the Customer Choice Jurisdictions in 2014 were actually lower than they had been in the 2008-2010 period, reflecting the market-responsive pricing behavior of the choice model.

Figure 11 shows 1997-2014 year-over-year cumulative percentage changes in weighted average prices for the Customer Choice Jurisdictions and Monopoly States. Under this price trend measure, Customer Choice Jurisdictions again outperformed Monopoly States: in Monopoly States such prices increased almost 60%, but only about 40% in Customer Choice Jurisdictions.

FIGURE 11: 1997-2014 YEAR-OVER-YEAR CUMULATIVE AVERAGE WEIGHTED PRICE CHANGE

CHOICE vs MONOPOLY



Although, this report does not purport to fully explain the favorable price performance of the Customer Choice Jurisdictions, it is worth highlighting some key factors:

- the development of capacity markets, including demand response as a resource, which send price signals about supply and demand and the economic value of capacity;
- prompt pass-through of natural gas prices and improved nuclear power plant performance;
- the unbundling of generation and delivery service pricing, thus providing valuable information for customers to enhance energy efficiency and alter usage patterns; and
- the ability of customers and retail providers in competitive markets to negotiate contract terms that tailor energy supply and pricing to load patterns and time of use.

MEASURING GENERATION INVESTMENT AND PERFORMANCE

Competition Attracts Generation Investment

Nearly two decades of empirical data not only debunk opponents' claims that competition would produce greater price increases and volatility, but also their claims that competition would undermine generation investment and harm reliability. On the contrary, competitive markets have attracted billions of dollars for tens of thousands of new megawatts of generating capacity that is, based on objective criteria, outperforming generation in the Monopoly States.

Competitive and Monopoly States Added Generation at Similar Paces from 1997-2013

Figure 12 shows that between 1997 and 2013, under both regulatory models there was substantial investment in new generation.[20] The 14 Customer Choice Jurisdictions added 73,900 MW of net summer capacity, a 28% increase, and the 35 Monopoly States added 206,800 MW of net summer capacity, a 40.5% increase. Figure 12 also shows the increases in generation output and in electricity consumption in the two groups of states.

FIGURE 12: 1997–2013 CHANGE IN CAPACITY, CONSUMPTION AND OUTPUT

CHOICE vs MONOPOLY

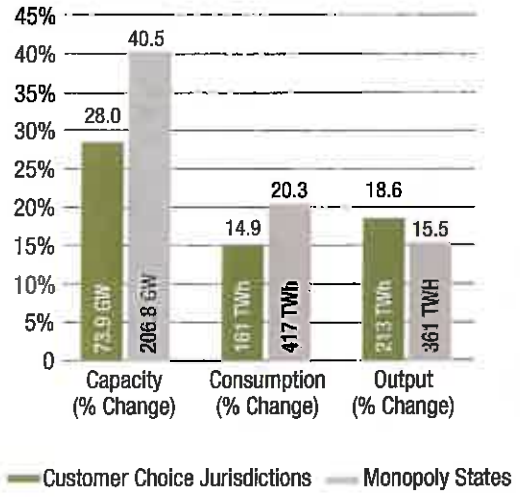
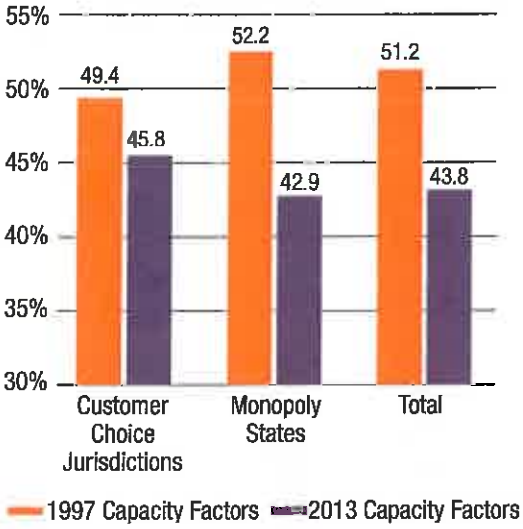


FIGURE 13: 1997–2013 % CHANGE IN CAPACITY FACTOR

CHOICE v MONOPOLY



Efficiency: Generation in Customer Choice Jurisdictions Has Better Capacity Factors

Figure 13 shows that Customer Choice Jurisdictions have moved ahead of Monopoly States in capacity factor, a standard electric industry measure of generation efficiency, i.e. the ratio of output to total potential production of a power plant.[21] In 1997, generation in the Choice Jurisdictions had an average capacity factor of 49.4%, whereas the Monopoly States' average factor was higher at 52.2%. By 2013, however, average capacity factors in the Customer Choice Jurisdictions exceeded those in the Monopoly States, 45.8% versus 42.9%. In the context of a decline in capacity factors across the 48 contiguous states and D.C. from an average of 51.2% in 1997 to 43.8% in 2013, the Customer Choice Jurisdictions improved their efficiency relative to the Monopoly States. As a result, the Customer Choice Jurisdictions switched positions with the Monopoly States relative to the national average, with the Choice Jurisdictions now having an average capacity factor above, rather than below, the national average.

Generation Effectiveness & Potency: Choice Jurisdictions Beat Monopoly States

In order to enhance comparisons of the electricity competition and monopoly models and to further test opponents' claims that competition cannot attract sufficient investment to maintain reliability, two additional generation performance measures were developed for this report: Effectiveness and Potency.

The first is "Effectiveness," that is the extent to which generating capacity additions have kept pace with growth in consumption, as measured by the ratio of the percentage growth in generating capacity to the percentage growth in consumption. The Effectiveness ratio assumes a positive figure for consumption growth in a group of states since 1997. Only Maine, Ohio and Oregon have has seen load decline since 1997.

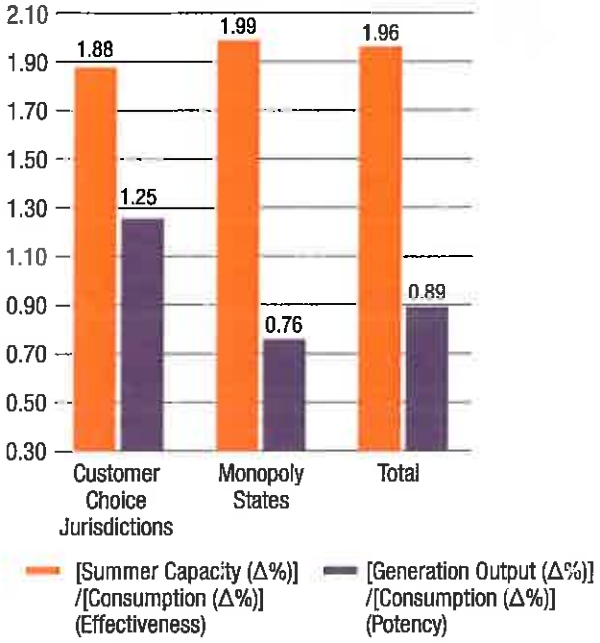
The second is "Potency," as measured by the ratio of the percentage change in generation production to the percentage change in consumption. This criterion focuses not simply on generation capacity, but also on how well the generating assets meet consumers' electricity needs.

Figure 14 shows that electricity consumption increased at different rates in Customer Choice Jurisdictions and the Monopoly States, but that they both added capacity at similar Effectiveness ratios of just under two times the rate of increase in MWh consumption: 1.88 in the Customer Choice Jurisdictions and 1.99 in the Monopoly States.

Figure 14 also shows, however, that under the Potency measure, generation in the Customer Choice Jurisdictions has substantially outperformed that in Monopoly States: the Potency ratio under choice was 1.25 compared to only 0.76 under monopoly regulation. Generation production in the Customer Choice Jurisdictions outpaced consumption growth, while in the Monopoly States consumption growth outpaced generation production.

FIGURE 14: 1997–2013 GENERATION EFFECTIVENESS AND POTENCY RATIOS:

CHOICE vs MONOPOLY



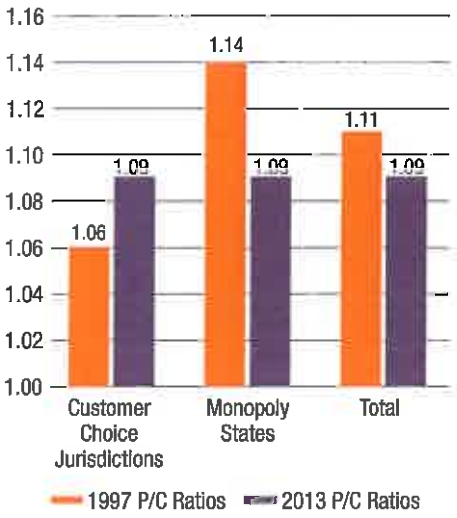
Resource Adequacy

A useful measure of Resource Adequacy in an electricity market or collection of markets is whether total annual generation production is equal to about 109% of total annual consumption. The 9% of production above consumption accounts for line losses and the like.[22] As shown in Figure 15, in 1997 the 14 Customer Choice Jurisdictions, as a group, were net importers, generating 106% of total consumption. In contrast, the 35 Monopoly States, as a group, were net exporters, generating 114% of total consumption. In 2013, however, both the Customer Choice Jurisdictions and Monopoly States, as groups, were at parity, each generating 109% of consumption.

FIGURE 15: 1997–2013 RESOURCE ADEQUACY:

CHOICE vs MONOPOLY

RATIO OF CAPACITY INCREASE TO CONSUMPTION INCREASE



In stark contrast to monopoly advocates' claim that Customer Choice discourages investment in capacity and therefore undermines supply adequacy and reliability, as the empirical data and objective criteria detailed above demonstrate, on both price and generation trends, competitive retail markets have performed as well as, or better than, monopoly retail markets.

The superior performance of the generation fleet in Customer Choice Jurisdictions is part of a broader transition of wholesale power transactions in the United States toward a framework that relies almost exclusively on market pricing under Federal Energy Regulatory Commission (FERC) supervision. FERC's fostering of Regional Transmission Organizations (RTOs) has facilitated the movement to non-discriminatory transmission of electricity, following in the steps of open access natural gas transmission.

Adding to the competitive dynamic has been the substantial growth since 1997 in the non-utility share of national generating capacity and the corollary decline in the share of generation controlled by vertically integrated monopoly utilities. In 1997 34% (260,206MW) of all generating capacity in the United States was owned by non-utility generators whereas in 2013 that figure had risen to 42% (448,149MW), closing the gap between utility and non-utility shares of generating capacity from a 32-point spread to just 16 points, on average about 1-point for each year during the competitive era.

THE COMPELLING EXAMPLE OF THE FIVE-STATE INDUSTRIAL UPPER MIDWEST

The East North Central region ("Industrial Upper Midwest")[23] offers an excellent opportunity for intra-regional comparison of the competitive and monopoly models. No other region has a comparable degree of regulatory diversity. Illinois and Ohio are competitive states; Indiana and Wisconsin have strictly adhered to traditional rate-of-return, monopoly regulation; and Michigan allows only 10% of utility load to shop, holding the remaining 90% of load captive to traditional monopoly.

The electricity supply market in Illinois has been largely competitive for over a decade, with open-access delivery rates set under regulated cost-of-service protocols.[24] In this respect, Illinois can be deemed the region's acid test of competition's relative performance. Applying empirical price/generation performance measurements used previously in the report, Illinois has outperformed the region's Monopoly States on most measures.

Comparing Prices Among the Five States

Figures 16a and 16b show the trend lines for nominal and percentage price change trends in each of the five states. Most significantly, Illinois moved from being the highest-priced state in 1997 to being the lowest-priced in 2014. Further, the two competitive states, Illinois and Ohio, had the lowest percentage price increases, with Illinois considerably lower than the other four states.

FIGURE 16a: 1997-2014 YEAR-TO-YEAR NOMINAL PRICE CHANGE

FIVE INDUSTRIAL UPPER MIDWEST STATES

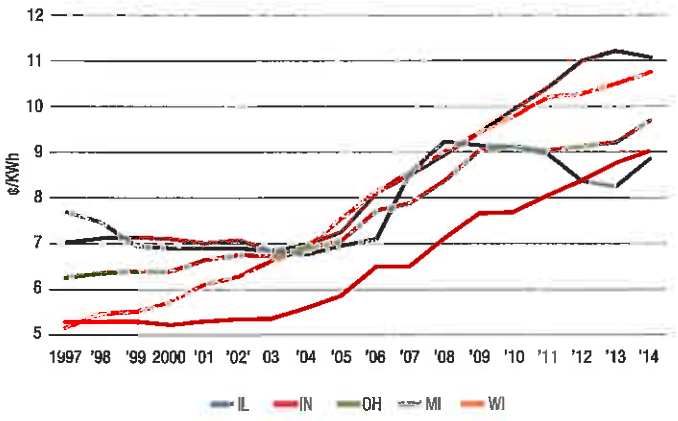
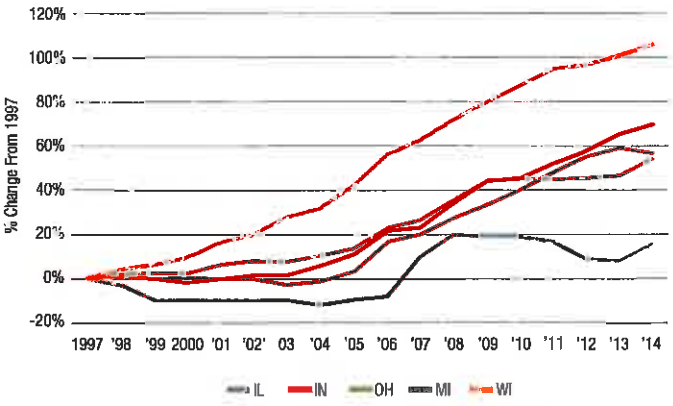


FIGURE 16b: 1997-2014 YEAR-TO-YEAR % PRICE CHANGE

FIVE INDUSTRIAL UPPER MIDWEST STATES



As shown previously in Figure 10, Illinois had the nation's lowest percentage price increase since 1997 (15.2%) while its monopoly neighbor, Wisconsin, had the highest (105.5%). Indiana, another next-door neighbor, had the 13th highest percentage price increase (69.7%), while Michigan's was somewhat higher than the median (57.7%), and Ohio's somewhat lower (54.6%).

Of particular interest is the most recent period (2008-2014) of economic stress and fairly flat load growth in the five-state Industrial Upper Midwest region.[25] The price trends in Illinois and Ohio, the two Customer Choice Jurisdictions in the region, highlight the central difference between competitive retail markets and monopoly

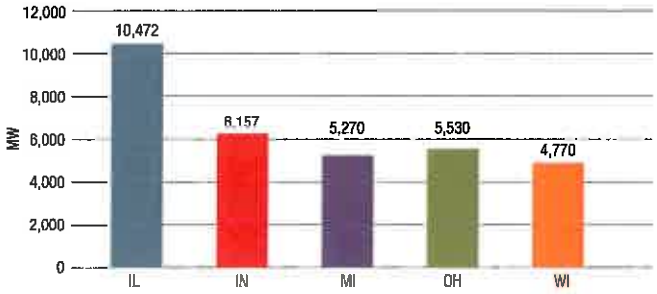
regulation. Monopoly regulation drove electricity prices substantially higher in Indiana, Michigan and Wisconsin, while prices in Illinois actually declined, and those in Ohio rose only modestly. As highlighted earlier in this report, monopoly regulation is driven by the imperative of setting tariffs to recover fixed costs and rising expenses even if doing so means increasing per unit prices because of a declining or static base, – ie. the "death spiral" syndrome. In contrast, competitive markets respond to actual economic conditions.

Both Competitive and Monopoly States in the Region Attracted Substantial Generation Investment

Figure 17 shows that all five states in the Industrial Upper Midwest Region have attracted billions of dollars in generation investment since 1997, creating a net increase in summer capacity of more than 32,000 MW. In no state has there been less than a 20% net increase. Notably, Illinois, the largest state in the region, and also the most competitively structured, accounted for nearly one-third of the capacity increase.

FIGURE 17: 1997–2013 INCREASE IN SUMMER MW CAPACITY

FIVE STATES INDUSTRIAL UPPER MIDWEST



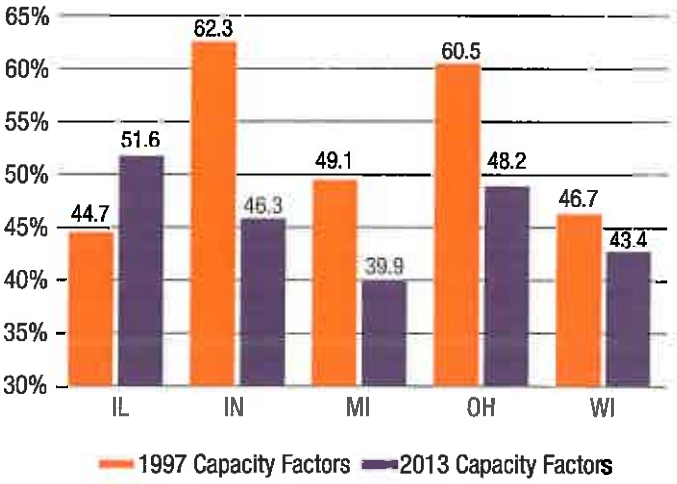
All five states increased summer generating capacity at a rate greater than the rate at which consumption increased. The Effectiveness Ratios were Illinois 2.60, Indiana 1.60, Michigan 3.66 and Wisconsin 2.52. Calculating an Effectiveness ratio for Ohio is not appropriate since Ohio added 20.5% to its summer capacity at the same time that consumption decreased by 5.2%. However, as the Effectiveness ratio requires, if a modest increase of just 1% in consumption is assumed, Ohio would have an Effectiveness ratio of 20.5.

Competitive States' Generation Is More Efficient

Figure 18 shows that, consistent with the overall national trend, capacity factors in the region generally declined. Illinois actually defied this national trend, increasing its average capacity factor from 44.7% to 51.6%, going from lowest to highest. Notably as well, the other Customer Choice Jurisdiction, Ohio, had the second-highest capacity factor in the region.

FIGURE 18: 1997–2013 CAPACITY FACTORS

FIVE STATES INDUSTRIAL UPPER MIDWEST



Illinois: The Region's Powerhouse

Figure 19 shows that Illinois moved from producing at only 106% of total consumption in 1997 to producing at 143% of total consumption in 2013, becoming by far the primary generation source in the five-state region. In contrast, the Monopoly State Indiana moved from net exporter to net importer. Similarly, Michigan, a marginal net exporter in 1997, had become a net importer in 2013.

FIGURE 19: 1997–2013 RESOURCE ADEQUACY

RATIO OF MWH PRODUCTION TO MWH CONSUMPTION:
FIVE STATES INDUSTRIAL UPPER MIDWEST

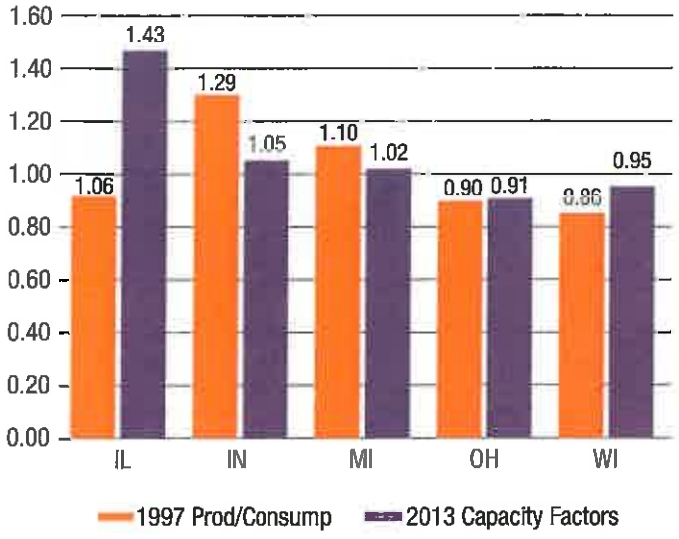
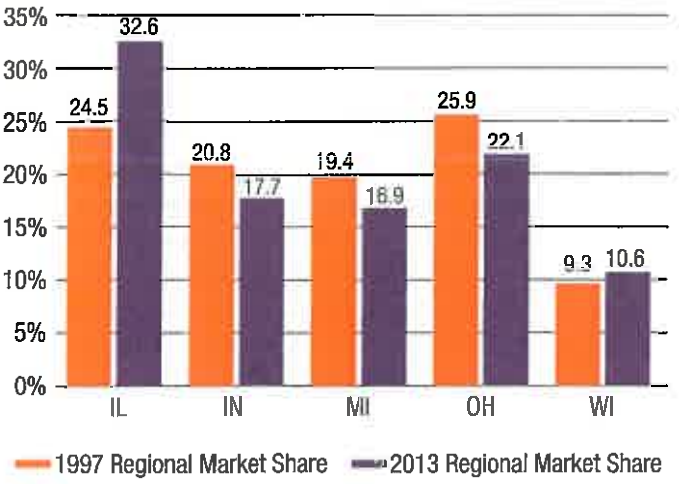


Figure 20 shows that Illinois' enhanced capacity factors were a key factor in its dramatic increase in generation market share in the region, moving it from only one-fourth of regional generation output in 1997 to nearly a third in 2013.

FIGURE 20: 1997-2013 REGIONAL GENERATION MARKET SHARES:

FIVE STATES INDUSTRIAL UPPER MIDWEST



Midwest Potency Gap

Figures 21 and 22 show that under competition, Illinois increased electricity production by 50% between 1997 and 2013 against an increase in consumption of 11.7%. The marked percentage production increase in Illinois was more than four times greater than the percentage increase in consumption, thus achieving a Potency ratio far exceeding the other states' performance. Ohio's positive ratio resulted from a 5.2% consumption decline which exceeded its 3.9% drop in generation production. Wisconsin's production increase of 28.3% was just short of two times the consumption increase of 15%. Indiana and Michigan, however, had negative Potency ratios. In Indiana, consumption increased 18.3%, but generation production fell 3.8%. In Michigan, consumption increased by 5.8%, but generation production decreased by 1.5%.

FIGURE 21: 1997–2013 % CHANGE IN GENERATION PRODUCTION:

FIVE STATES INDUSTRIAL UPPER MIDWEST

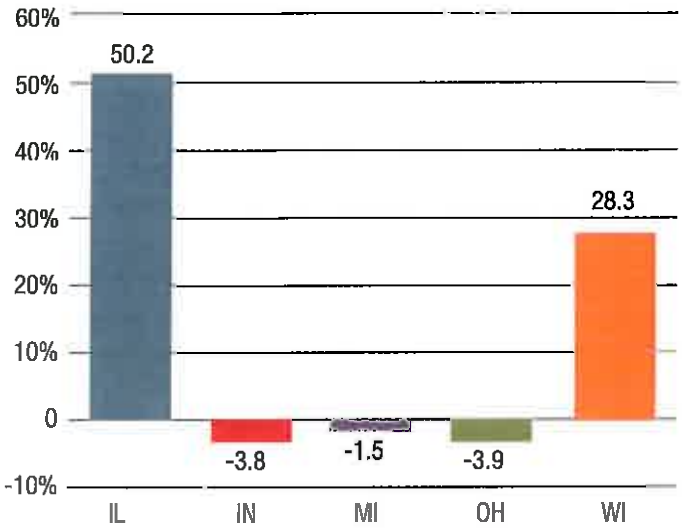


FIGURE 22: 1997–2013 POTENCY RATIO OF % INCREASE IN MWH PRODUCTION TO MWH CONSUMPTION

FIVE STATES INDUSTRIAL UPPER MIDWEST

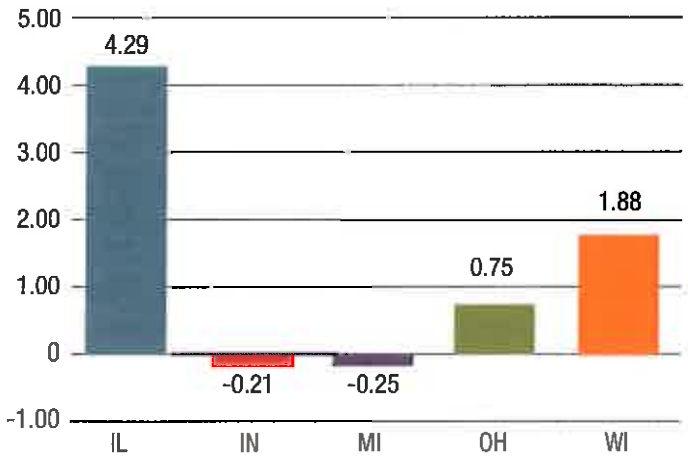
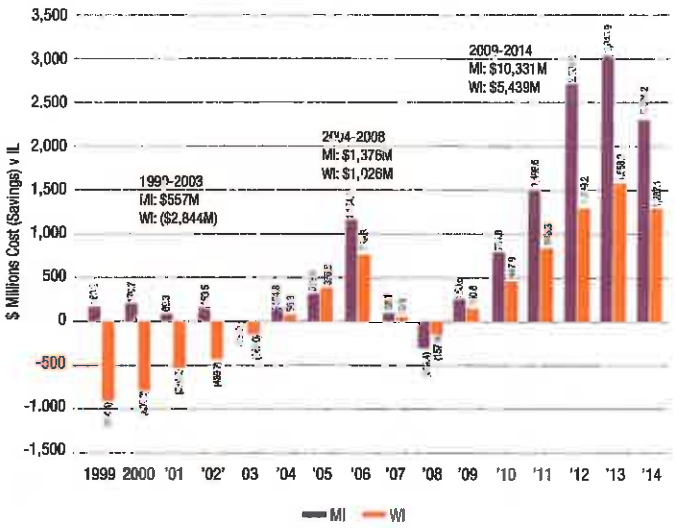


FIGURE 23: 1997–2104 YEAR-BY-YEAR DOLLAR DISCREPANCY IF MICHIGAN & WISCONSIN CUSTOMERS HAD PAID ILLINOIS COMPETITIVE PRICES



The Dollar Discrepancy

In the region, especially with respect to Illinois, Michigan and Wisconsin, the competitive and monopoly models have been associated with dramatically different price trends for consumers. As noted earlier in this report, the appropriate focus is not a snapshot of prices, but the relative price trends in the states since the commencement of competition. At the start of the competitive era, Illinois electricity prices far exceeded those in Wisconsin, whereas Illinois and Michigan prices were quite similar. In the ensuing years, however, prices in Wisconsin and Michigan rose to levels well above those in Illinois.

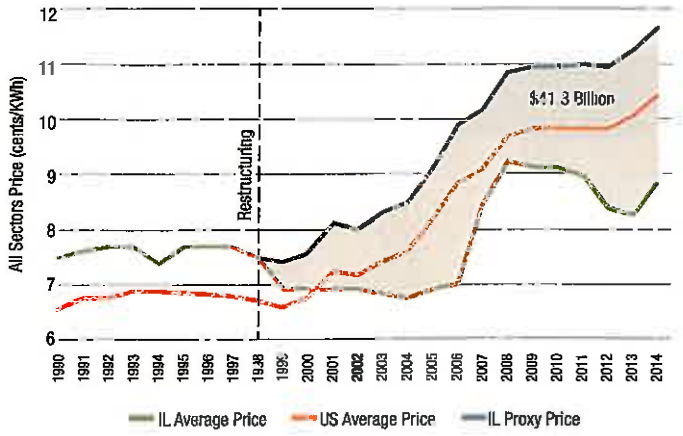
Figure 23 shows the year-by-year dollar value of the divergent price trends. In the initial period, 1999-2003, Michigan and Illinois remained closely aligned on price while Wisconsin exhibited an eroding price advantage. In the middle period 2004-2008, prices in Wisconsin and Michigan began to exceed those in Illinois, with customers in each of those Monopoly States paying price premiums of more than $1 billion above what they would have paid if Illinois' competitive prices had been available. During 2009-2014 the above-market premiums consumers paid in the Monopoly States exploded, with Michigan customers paying a total premium of $10.6 billion and those in Wisconsin paying a $5.6 billion premium. A detailed chart of the dollar discrepancy calculations appears in the Appendix to this report.

Illinois' $41 Billion Improved Price Position

The competition/monopoly comparison in this region would be incomplete without including a calculation using the same method as made in a recent report.[26] During 1990-1998, i.e. the years immediately preceding implementation of choice in Illinois, the state's average electricity price consistently exceeded the national average weighted price by an average of nearly 12%. Following the implementation of choice, Illinois' relative price position changed dramatically, averaging from 1999-2014 a 9% discount to the national average weighted price, yielding an advantageous 21 percentage point average spread between the pre-choice price premium and the post-choice price discount.

Figure 24 shows the 1990-1998 pre-competition trend lines for actual Illinois average electricity prices and national average prices, and the trend lines for those actual average prices during the competitive period 1999-2014, alongside a 1999-2014 proxy price for Illinois. The proxy price reflects the average price premium if Illinois had maintained the same relative price position as in the pre-competition period. Through 2014, the value of the difference between the actual average Illinois competitive price, which has been consistently below the national level, and the proxy price, is $41.3 billion.

FIGURE 24: ILLINOIS IMPROVED ITS PRICE POSITION BY $41.3 BILLION: 1999–2014 vs 1990–1998



PLATFORMS FOR THE FUTURE: RETAIL COMPETITION OR MONOPOLY REGULATION?

Empirical data for key indicators demonstrate that the retail electric choice revolution has evolved successfully: consumers increasingly embrace competition and Customer Choice Jurisdictions have outperformed Monopoly States in both price and generation trends. In particular:

- From 2003-2013, accounts served competitively increased 524% for C&I and 636% for residential.
- Similarly, from 2003-2014 electrical load served competitively surged even during a period of flat growth in consumption: 181% for C&I and 673% for residential.
- As a group, Customer Choice Jurisdictions outperformed Monopoly States on price, with average prices increasing less than inflation in competitive markets and far exceeding inflation under monopoly regulation.
- Generation in Customer Choice Jurisdictions as a group outperformed that in Monopoly States, producing billions of dollars of new, more efficient generation with higher capacity factors than in Monopoly States.

Given the sustained, demonstrable success of Customer Choice both in price trends and in generation investment and performance, the debate should shift focus to the question of whether retail customer choice or monopoly regulation provides a better platform for addressing other current significant issues, such as:

- Stimulating and accommodating innovation in technologies and services such as smart meters to empower consumers.
- Reconciling environmental policies with the energy needs of consumers and allocating risks among market participants as coal plants retire and replacement generation is installed.
- Modernizing and streamlining regulation in order to direct limited regulatory resources to the most important public policy concerns and enhance responsiveness to fast changing economic, financial and technology conditions.

APPENDIX

1999-2014 YEAR-TO-YEAR CUMULATIVE DOLLAR DISCREPANCY IF MICHIGAN AND WISCONSIN CUSTOMERS HAD PAID COMPETITIVE ILLINOIS AVERAGE ALL-SECTOR PRICES

Year	IL W.A Price (c/KWh)	MI W.A Price (c/KWh)	MI Difference (c/KWh)	MI Annual MWh	Premium ($M)	WI W.A Price (c/KWh)	WI Difference (c/KWh)	WI Annual MWh	Premium ($M)
1999	6.97	7.13	0.16	103,981,004	163.2	5.53	-1.44	63,547,451	-914.4
2000	6.94	7.11	0.17	104,772,214	179.7	5.71	-1.23	65,146,487	-802.3
2001	6.90	6.97	0.07	102,409,346	69.3	6.08	-0.83	65,218,293	-539.9
2002	6.94	7.09	0.15	104,713,520	158.5	6.28	-0.66	66,999,297	-439.7
2003	6.86	6.85	-0.01	108,877,192	-13.5	6.64	-0.22	67,241,496	-148.0
Subtotal					**557.2**				**-2,844.3**
2004	6.80	6.94	0.15	106,606,041	154.8	6.88	0.08	67,975,710	56.3
2005	6.95	7.23	0.28	110,444,564	313.9	7.48	0.54	70,335,684	376.8
2006	7.07	8.14	1.07	108,017,697	1,154.1	8.13	1.06	69,820,749	739.6
2007	8.46	8.53	0.06	109,296,748	68.1	8.48	0.02	71,301,301	10.9
2008	9.23	8.93	-0.30	105,781,272	-314.4	9.00	-0.23	70,121,827	-157.9
Subtotal					**1,376.5**				**1,025.7**
2009	9.15	9.40	0.26	98,121,014	250.6	9.38	0.23	66,286,439	150.6
2010	9.13	9.88	0.76	103,649,219	784.8	9.78	0.65	68,752,418	447.9
2011	8.97	10.40	1.43	105,053,559	1,499.6	10.21	1.23	68,611,620	846.3
2012	8.40	10.98	2.58	104,818,192	2,708.8	10.28	1.89	68,820,090	1,299.2
2013	8.26	11.21	2.95	103,038,305	3,043.9	10.51	2.25	69,124,043	1,558.2
2014	8.86	11.10	2.23	102,700,106	2,294.2	10.73	1.86	69,056,106	1,287.1
Subtotal					**10,582.0**				**5,589.3**
TOTAL					**12,515.7**				**3,770.7**

ENDNOTES

[1] DNV GL provides authoritative information on competitive electricity markets (www.dnvgl.com/energy) and the U.S. Energy Information Administration (EIA) is the premier source for federally collected energy data (eia.gov).

[2] Customer choice and monopoly models also operate in parallel in other parts of the world. For a slightly dated cross-national comparative discussion see "Electricity in Europe and North America, the Grand Experiment: Has Restructuring Succeeded on Either Continent?", *Public Utilities Fortnightly*, February 2007, Terrence L. Barnich and Philip R. O'Connor.

[3] Alaska and Hawaii are not included in the analyses conducted for this report because they are not connected to the major North American electrical grid networks and therefore are electrically isolated.

[4] The fourteen Customer Choice Jurisdictions are: Connecticut, Delaware, District of Columbia, Illinois, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island and Texas. Each provides nearly universal eligibility for customers of all types to exercise choice. Supply provided by local utilities is priced mainly as a function of competitive wholesale procurement at market prices.

[5] Texas is unique in two respects. First, the Electric Reliability Council of Texas (ERCOT), accounting for about 90% of all load in the state, is regulated exclusively by the state rather than by the Federal Energy Regulatory Commission (FERC) in contrast to other regional transmission organizations (RTOs). Customer Choice is unavailable to the 10% of load in Texas outside ERCOT. As is the case in other states, customers of municipal utilities and rural cooperatives also do not have market access. Second, Texas is an exception in that investor-owned utilities in the ERCOT market are entirely out of the supply business. Utility affiliates generally serve as default providers for residential and small business customers.

[6] Nevada and Virginia terminated restricted access programs prior to 2014. Arizona, California, Michigan, Montana and Oregon permitted small slices of load to be served competitively in 2014. Choice load in these states is almost exclusively C&I, totaling only about 50,000 accounts. In 2014, the share of total load competitively served in these five states was: Arizona 1.5%; California 9.6%; Michigan 8.1%; Montana 14.1% and Oregon 3.8%. As restrictions increased, competitive load in all limited choice states, as a group, declined from a total of 78.6 million MWh, or 26% of national choice load in 2003, to 38 million MWh or just 5%.

[7] For example, the change in the weighted average price between 1997 and 2014 in the seven restricted access states (AZ, CA, MI, MT, NV, OR, VA) was 60.3% as a straight average, nearly identical to the 60% for the 28 states that have never implemented choice. Further, the weighted nominal increase in average prices for the restricted access states was 57.5% compared to 61.7% in the strictly 28 Monopoly States. As the seven restricted access states and the 28 strictly Monopoly States are essentially indistinguishable from one another they can be combined for comparisons with the Customer Choice Jurisdictions.

[8] Competitively served accounts include residential and small business customers in several states under municipal aggregation programs that procure supply through competitive procurement processes and generally permit customers to opt-out in order to take service from alternative suppliers or default service from local utilities.

[9] Year-end 2014 DNV GL figures for customer accounts are for 2013 and thus lag behind competitive load figures by a year. Given the growth in load, the customer account figures for 2014 will certainly be higher than for 2013.

[10] In the five restricted access states, virtually all eligible customers, mainly C&I, are enrolled in choice programs. There is considerable pressure for open access from non-residential customers who are being denied choice in Arizona, California and Oregon as well as in Nevada where limited choice was terminated. Michigan, which since 2008 has capped choice at 10% of load in any utility service area, provides a compelling example of customers' unmet demand for choice. More than 11,000 customers, with annual consumption of over 12 million MWh, have enrolled in the "queue" hoping for market access if room under the 10% load cap becomes available. See the Michigan Public Service Commission for current information on the queue at http://www.dleg.state.mi.us/mpsc/electric/restruct/faq/cap_data.html .

[11] Arizona, California, Michigan, Montana and Oregon permitted small slices of load to be served competitively in 2014. Choice load in these states is almost exclusively C&I, with only about 50,000 accounts served by competitive suppliers. Nevada and Virginia terminated restricted access programs prior to 2014. The shares of total load competitively served in 2014 in the five restricted access states were Arizona 1.5%, California 9.6%, Michigan 8.1%, Montana 14.1% and Oregon 3.8%. Competitive load in all restricted choice states, as a group, declined from a total of 78.6 million MWh, or 26% of national choice load in 2003, to 38 million MWh or just 5% as restrictions were increasingly applied.

[12] In most of the Customer Choice Jurisdictions some load is served by municipal utilities and rural cooperatives that have generally been permitted to maintain their traditional monopolies and to set their rates without state utility commission approval.

[13] The analysis in this report uses weighted average prices to compare the two groups of states, competitive and monopoly. To standardize the basis for prices, weighted average prices take account of sales volumes in each state in the two groups by combining all revenue and dividing by all consumption in order. One of the customary flaws in analyses of the two groups of states by critics of Customer Choice is their use of the straight average which, for example, gives the same weight to Idaho as to Florida within the monopoly group or to Delaware and Texas within the competitive group. The annual reports of the American Public Power Association (APPA) on price differences between traditionally regulated and choice groups of states are prime examples of this analytical flaw. The APPA reports rely on straight averages when calculating an average price for the two groups of states, which distorts the actual average price being paid by all customers in the two groups. Further, in reporting on the spread between average prices in the two groups of states, the APPA reports ignore inflation, thereby claiming erroneously that the price gap has grown even though the percentage gaps have narrowed and the rate of increase in prices has been higher in the Monopoly States – even when using straight averages rather than weighted prices. The APPA reports also make the mistake of relying exclusively on inter-temporal comparisons of nominal prices, thus failing to adjust for inflation. http://www.publicpower.org/Programs/interiordetail2col.cfm?ItemNumber=38695&navItemNumber=38586

[14] Inflation is based on the U.S. Bureau of Labor Statistics monthly estimates of the Consumer Price Index for all urban areas (CPI-U). http://www.bls.gov/data/inflation_calculator.htm

[15] While the straight average price technique's lack of standardization makes it methodologically unsuitable for comparing price trends between the two groups of states, it must be noted that there are, nonetheless, similar results with respect to percentage changes in weighted average price for the two groups. The 1997-2014 percentage all-sector straight average price increase for the 14 Customer Choice Jurisdictions was 44.6% compared to 60% for the Monopoly States, similar to the weighted average price increase of 40.8% and 59.9%, respectively.

[16] See *Transmission Constraints in the Western and Eastern Interconnections 2009-2012*, U.S. Department of Energy, January 2014, 30.

[17] The problem of price distortion and therefore price signals in traditional vertical monopoly regulation was identified as a central issue by advocates of electric industry competitive restructuring as far back as the mid-1980s. See "Competition, Financial Innovation and Diversification in the Electric Industry," Philip R. O'Connor, Robert G. Bussa and Wayne P. Olson, *Public Utilities Fortnightly*, February 20, 1986.

[18] The data also debunk monopoly advocates' contention that competitive retail prices are naturally more volatile. First, claims of competitive market price volatility confuse prices in the real-time wholesale energy market with prices actually paid by retail customers of alternative suppliers. While some customers do avail themselves of real-time prices, most contract for various levels of certainty, including full-requirements fixed prices and mixes of fixed and variable pricing, depending on risk tolerance and budgeting goals. Second, competitive retail customers can select differing lengths of contract terms, thus locking in price certainty unavailable in Monopoly States in which utilities and regulators control the timing, magnitude and design of price changes. Customers in Monopoly States also cannot fix the point in time at which their prices will change or change that point in time during the midst of a contract period if they want to further hedge prices. The most recent research on the topic shows that there is no material difference between monthly price volatility in competitive states and traditionally regulated states. See "The Electricity Choice Debate: Conjectures and Refutations," *The Electricity Journal,* Aug/Sept, Vol. 27, Issue 7, Jonathan A. Lesser and Philip R. O'Connor.

[19] Energy Information Administration (EIA) at http://www.eia.gov/dnav/ng/ng_pri_sum_a_epg0_pg1_dmcf_m.htm

[20] The most recent EIA data on installed generating capacity and production are for 2013. Calculations for 2013 therefore also use 2013 consumption data.

[21] Capacity factor is a standard measure in the electric industry for generator performance, represented as the percentage of total output in a period if the unit were operating at full capacity. On an annual basis that would be the number of total net megawatt hours produced as a percent of the total number of megawatts of capacity multiplied by 8,760, the number of hours in a 365-day year.

[22] A state or group of states generating 109% or more of retail sales can reasonably be regarded as in resource balance. In the years 2008-2014 that national figure hit a high of 110.32% in 2008 and a low of 109.15% in 2013. Net imports vary somewhat year-to-year but generally constitute a net amount equal to about 1% of domestic generation. On this basis, 109% can be considered for this purpose minimum domestic resource adequacy.

[23] Illinois, Indiana, Michigan, Ohio, and Wisconsin are customarily treated as the East North Central region for data gathering and presentation by such federal bodies as the EIA, the U.S. Census Bureau and the U.S. Bureau of Labor Statistics.

[24] Legislation enacted in Illinois in 2011 (Energy Infrastructure Modernization Act ("EIMA"), 220 ILCS 5/16-108.5) authorized cost recovery mechanisms for ongoing investment in the electricity delivery network by the state's major distribution utility companies. The legislation streamlined the regulatory process, including return on equity formulations tied to Treasury debt rates and a reliance on annual FERC Form 1 data, so as to strengthen and modernize the grid by facilitating deployment of advanced meter infrastructure (AMI) and other digital Smart Grid technologies. The law also prescribed various utility performance metrics, consumer protections and oversight by regulators and the legislature.

[25] As a group, the five Industrial Upper Midwest states have experienced substantially lower growth than the other contiguous states as a group. Electricity sales volumes in the five states in 2014 grew just 6.1% from 1997, while growth in the other states was 21.1%. Notably, in five out of the past seven years, the Midwest states saw year-to-year declines in consumption.

[26] A version of the chart showing the improved price position of Illinois since the commencement of Customer Choice implementation appeared in *Electricity & Natural Gas Customer Choice in Illinois: A Model of Effective Public Policy Solutions,* A Joint Report of the Illinois Chamber of Commerce, Illinois Manufacturers' Association, Illinois Retail Merchants Association and Illinois Business Roundtable, February 2014. The report can be found at http://irma.org/wp-content/uploads/2014/03/Illinois-Energy-Reform-Feb-2014.pdf

NOTE ON AUTHORS

Philip R. O'Connor is President of PROactive Strategies, Inc. and a former utility regulator, having served as Chairman of the Illinois Commerce Commission when, in 1984, the ICC issued the first white paper by a utility commission calling for a transition to competitive electricity markets. In addition to his lengthy private sector career, O'Connor has been appointed by six consecutive Illinois governors to various cabinet, board and transition committee positions, including as Director of Insurance and as a member of the State Board of Elections. He earned his doctorate in political science from Northwestern University and in 2007-8 served in the U.S. Embassy in Baghdad, Iraq as an advisor to the Iraqi Ministry of Electricity.

Erin M. O'Connell-Diaz is President of FutureFWD, Inc. and a veteran utility regulator having served two terms as a Commissioner at the Illinois Commerce Commission as well as its Deputy Chief Administrative Law Judge and as an Assistant Attorney General. Erin is the most experienced regulator in America in the transition to and implementation of electricity retail competition. She chaired the Electricity Committee of the National Assoc. of Utility Regulatory Commissioners, served on its Board of Directors, numerous committees and was lead regulator for USAID/DOE programs to Brazil and Kosovo. She is a Senior Fellow for Governing Institute and serves on the New Mexico State University Public Utilities Advisory Council. Erin is a cum laude graduate of St. Mary's of Notre Dame and received her J.D. from Loyola University School of Law.

Clean Power Plan: State at a Glance

Ohio

In the final Clean Power Plan (CPP), EPA is establishing interim and final carbon dioxide emission performance rates for the two types of electric generating units - steam electric and natural gas fired power plants - under Section 111(d) of the Clean Air Act. The CPP also establishes state-specific interim and final goals for each state, based on these limits and each state's mix of power plants. The goals are expressed in two ways—rate-based and mass-based— either of which can be used by the state in its plan. States that choose a mass-based goal must assure that carbon pollution reductions from existing units achieved under the Clean Power Plan do not lead to increases in emissions from new sources. EPA is offering an option to simplify this requirement for states developing plans to achieve mass-based goals. If a state chooses this route, its state planning requirements are streamlined, avoiding the need to meet additional plan requirements and include additional elements.

EPA has a "goal visualizer" tool on the web at www.epa.gov/cleanpowerplantoolbox that walks through the exact calculations for Ohio.

Ohio's Interim (2022-2029) and Final Goals (2030)

OHIO			
	CO_2 Rate (lbs/Net MWh)	CO_2 Emissions (short tons)	
2012 Historic [1]	1,900	102,239,220	
2020 Projections (without CPP)	1,742	103,946,835	
	Rate-based Goal	Mass-based Goal (annual average CO_2 emissions in short tons)	Mass Goal (Existing) & New Source Complement
Interim Period 2022-2029	1,383	82,526,513	83,476,510
Interim Step 1 Period 2022-2024 [2]	1,501	88,512,313	88,902,150
Interim Step 2 Period 2025-2027 [3]	1,353	80,704,944	82,020,069
Interim Step 3 Period 2028-2029 [4]	1,252	76,280,168	77,522,714
Final Goal 2030 and Beyond	1,190	73,769,806	74,607,975

1. EPA made some targeted baseline adjustments at the state level to address commenter concerns about the representativeness of baseline-year data. These are highlighted in the CO_2 Emission Performance Rate and Goal Computation TSD.

2, 3, 4. Note that states may elect to set their own milestones for Interim Step Periods 1, 2, and 3 as long as they meet the interim and final goals articulated in the emission guidelines. In its state plan, the state must define its interim step milestones and demonstrate how it will achieve these milestones, as well as the interim goal and final goal. See section VIII.B of the final rule preamble for more information.

The final Clean Power Plan goals for Ohio look different from the proposed goals – the 2030 goal looks more stringent, and the interim goal looks more stringent.

States' goals fall in a narrower band, reflecting a more consistent approach among sources and states.

At final, all state goals fall in a range between 771 pounds per megawatt-hour (states that have only natural gas plants) to 1,305 pounds per megawatt-hour (states that only have coal/oil plants). A state's goal is based on how many of each of the two types of plants are in the state.

The goals are much closer together than at proposal. Compared to proposal, the highest (least stringent) goals got tighter, and the lowest (most stringent) goals got looser.

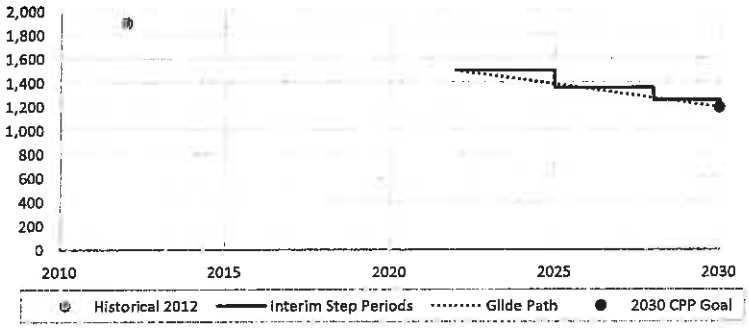
- Ohio's 2030 goal is 1,190 pounds per megawatt-hour. That's in the middle of this range, meaning Ohio has one of the moderate state goals, compared to other state goals in the final Clean Power Plan.
- Ohio's step 1 interim goal of 1,501 pounds per megawatt-hour reflects changes EPA made to provide a smoother glide path and less of a "cliff" at the beginning of the program.

The 2012 baseline for Ohio was adjusted to be more representative, based on information that came in during the comment period.

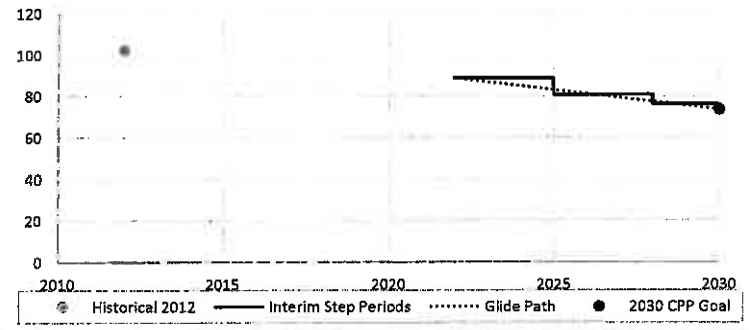
Pathway to 2030: While EPA's projections show Ohio and its power plants will need to continue to work to reduce CO_2 emissions and take additional action to reach its goal in 2030, these rates – and that state goal – are reasonable and achievable because no plant and no state has to meet them alone or all at once. They are designed to be met as part of the grid and over time. In fact, the rates themselves, and Ohio's goal, reflect the inherent flexibility in the way the power system operates and the variety of ways in which the electricity system can deliver a broad range of opportunities for compliance for power plants and states. EPA made improvements in the final rule specifically for the purpose of ensuring that states and power plants could rely on the electricity system's inherent flexibility and the changes already under way in the power sector to find affordable pathways to compliance.

- **Flexibility in state plans and easier access to trading programs.** States can use EPA's model trading rules or write their own plan that includes trading with other "trading-ready" states, whether they are using a mass- or rate-based plan.
- **Clean Energy Incentive Program available for early investments.** This program supports renewable energy projects – and energy efficiency in low-income communities – in 2020 and 2021.
- **The period for mandatory reductions begins in 2022, and there is a smoother glide path to 2030.** The glide path gradually "steps" down the amount of carbon pollution. Note that states may elect to set their own milestones for interim step periods 1, 2 and 3 as long as they meet the interim goal overall or "on average" over the course of the interim period, and meet the final goals, established in the emission guidelines. To accomplish this, in its state plan, the state must define its interim step milestones and demonstrate how it will achieve these milestones, as well as the overall interim, and final, goals.
- **Energy efficiency available for compliance.** Demand-side EE is an important, proven strategy that states and utilities are already widely using, and that can substantially and cost-effectively lower CO_2 emissions from the power sector. EPA anticipates that, thanks to their low costs and large potential in every state and region, demand-side EE programs will be a significant component of state compliance plans under the Clean Power Plan. The CPP's flexible compliance options allow states to fully deploy EE to help meet their state goals.

Ohio CO_2 Rates (lbs/MWh)



Ohio CO_2 Mass (million short tons)



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Summary: Exhibit Attachment EWH-3 to the Direct Testimony of Edward W. Hill electronically filed by Mrs. Kimberly W. Bojko on behalf of OMA Energy Group