

Retail Choice in Electricity: What Have We Learned in 20 Years?

Mathew Morey & Laurence Kirsch
Christensen Associates Energy Consulting
www.caenergy.com

March 7, 2016

Presentation Outline

- ❑ Summary
- ❑ Status of Retail Choice
- ❑ Drivers of Retail Choice
- ❑ Retail Choice History
- ❑ Challenges
- ❑ Outcomes



SUMMARY

Innovative Service Offerings

- ❑ RC extends penetration of dynamic pricing programs that reflect power system conditions.
- ❑ RC promotes renewable resources but may raise resource adequacy issues because of non-dispatchability.
- ❑ RC has a mixed record in promoting demand response.
- ❑ RC has not generally promoted smart metering.

Impacts on Consumer Prices

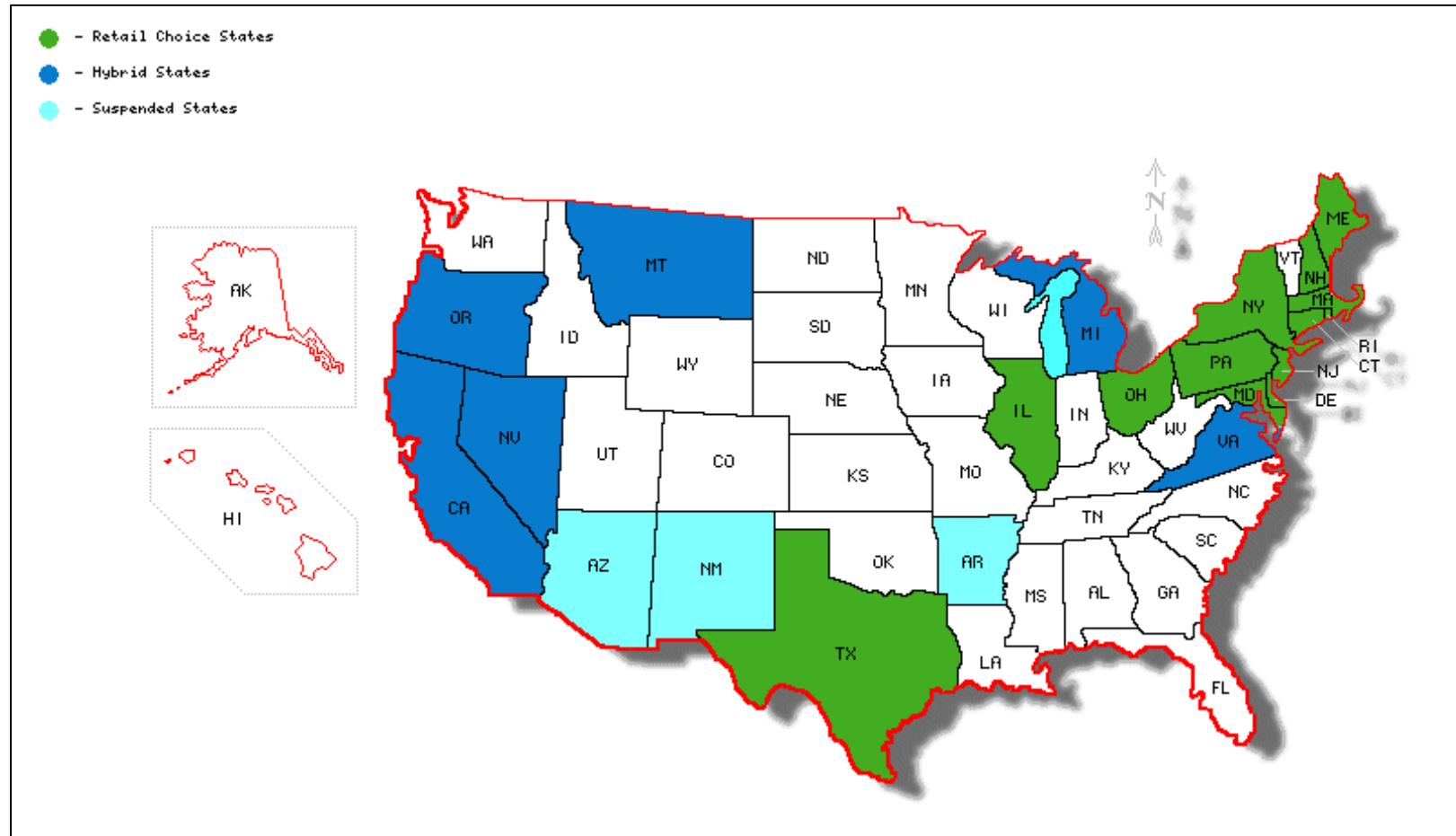
- ❑ RC prices vary with fuel prices and are less stable than non-RC prices.
- ❑ RC prices vary by location and mimic locational variations in wholesale prices.
- ❑ Statistical studies have reached contradictory conclusions about price impacts of RC.
 - EU experience gives no clear signal about how RC affects retail prices.

Costs of Choice

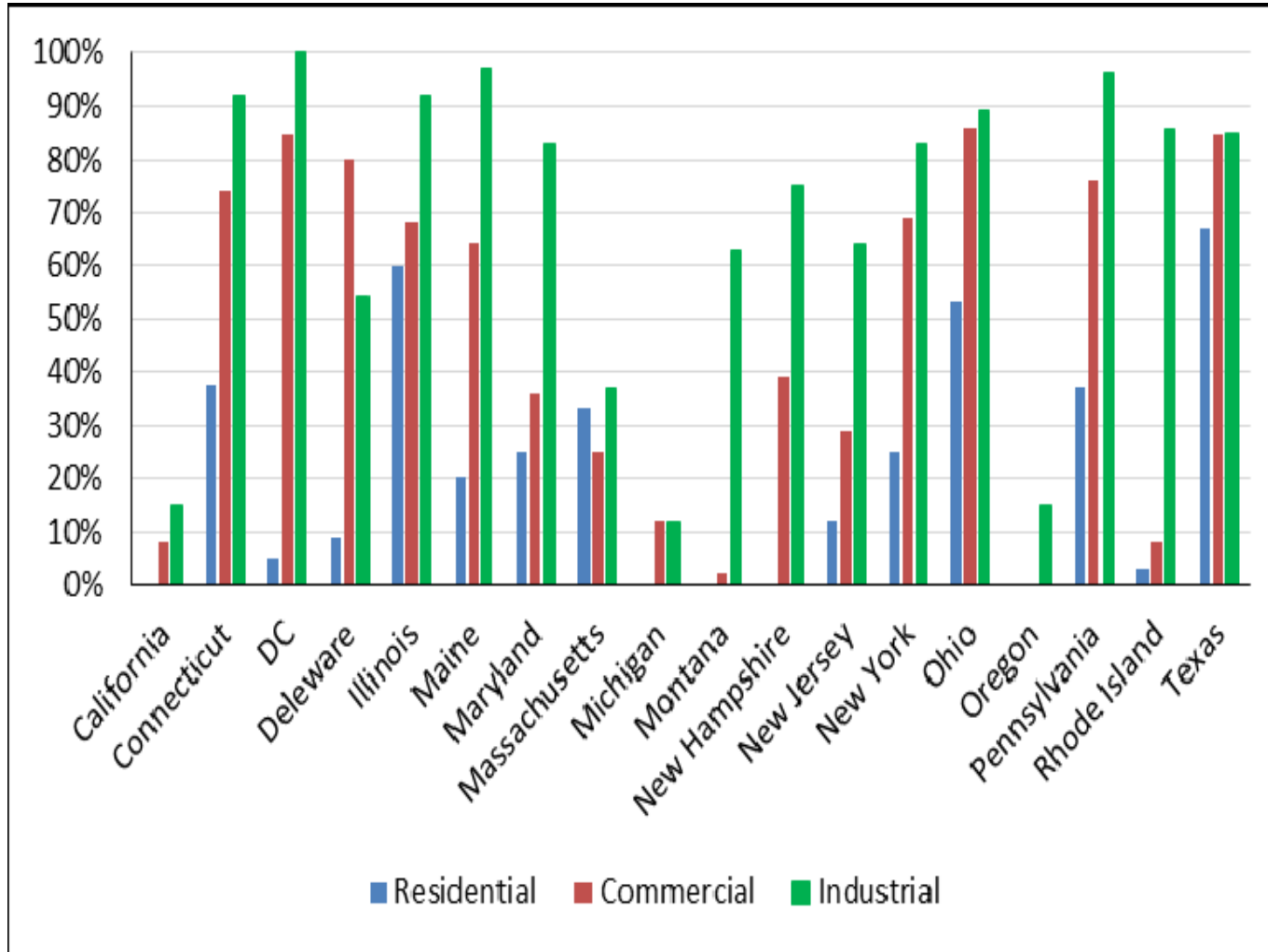
- ❑ Uncertainties associated with RC – like short-term sales contracts and uncertain future market conditions – raise capital costs that must be recovered in prices.
- ❑ RC has greater risk of retail supplier bankruptcies, which may increase the costs borne by consumers.
- ❑ RC has additional costs – like for metering, billing procedures, and marketing – that must be recovered in prices.

STATUS OF RETAIL CHOICE

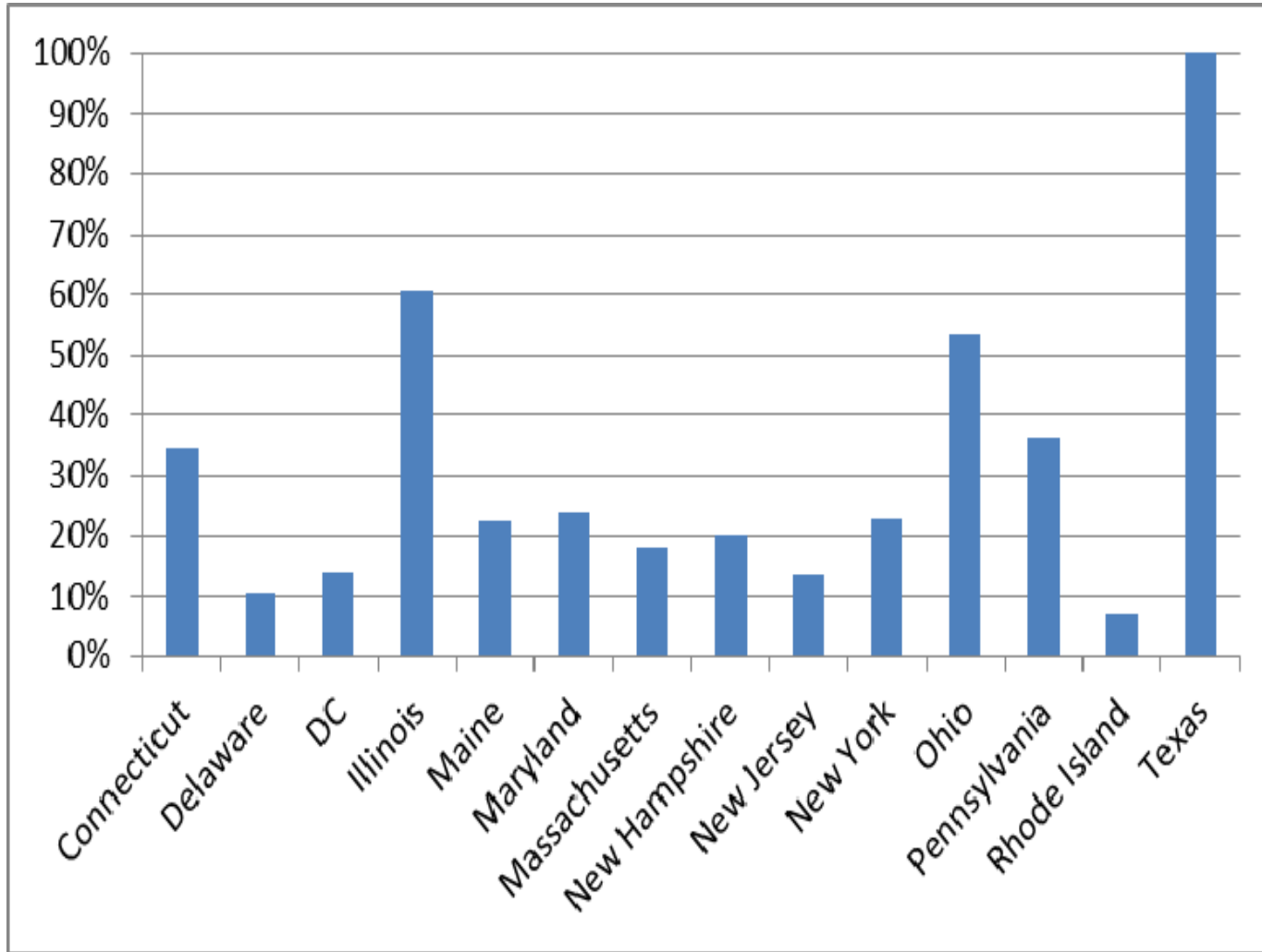
Status of Retail Choice



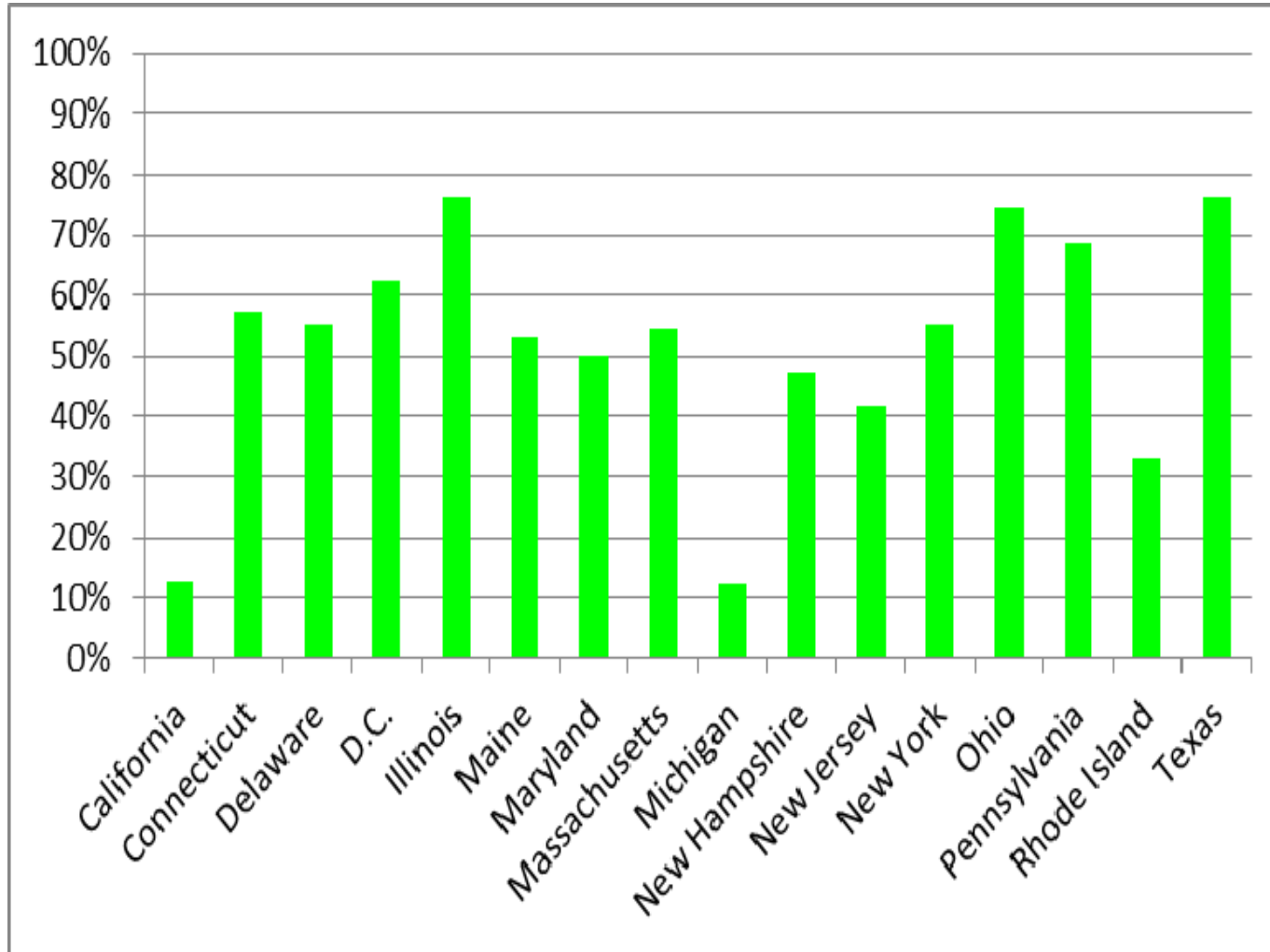
Competitive Retail Energy Suppliers' Retail Sales as Shares of Total MWh Sales, 2014



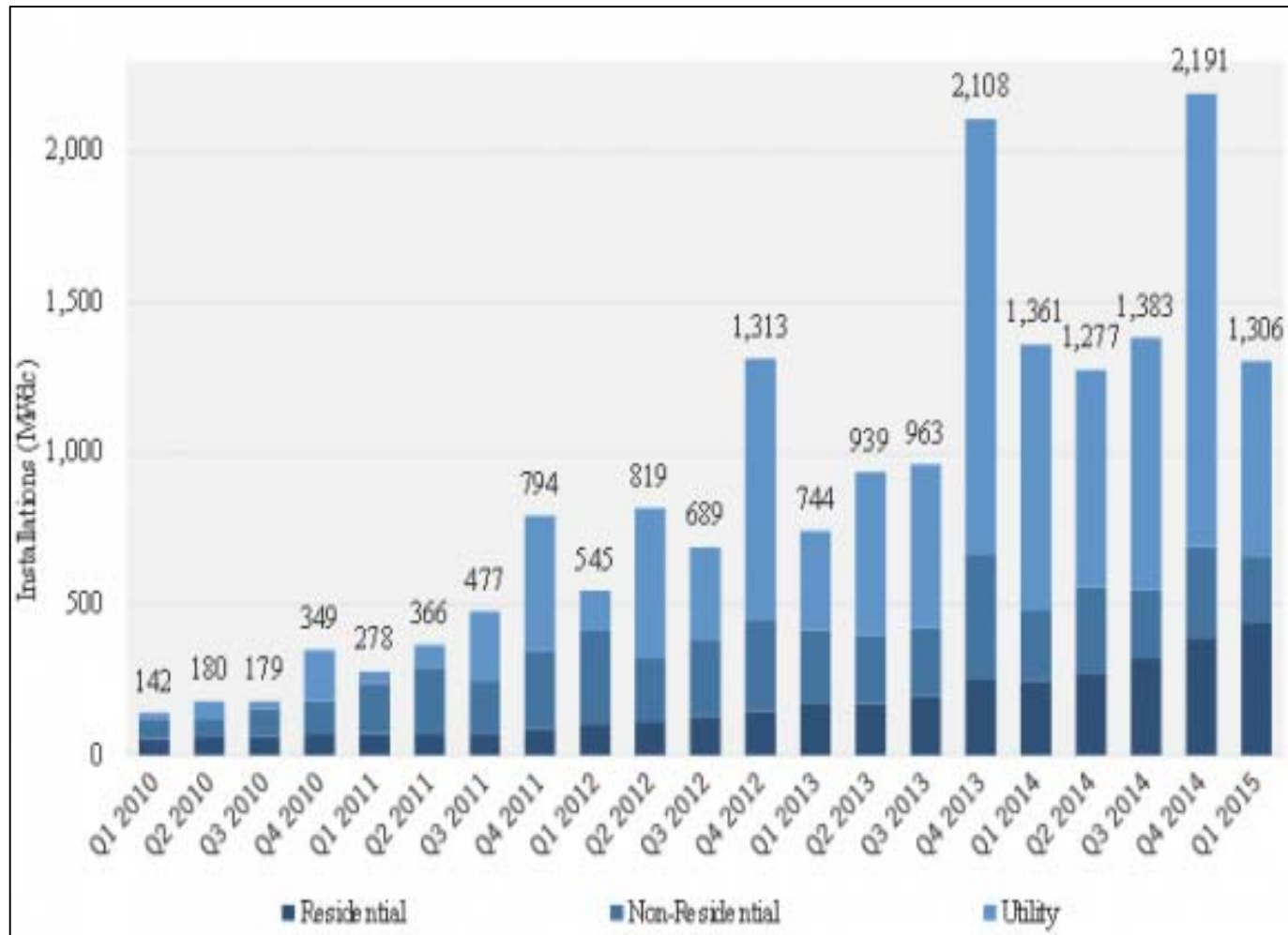
Residential Customers Taking Competitive Electric Service as Shares of Eligible Customers, 2014



Percent of Eligible Commercial & Industrial Loads Taking Competitive Electric Service from Non-Incumbent Providers, 2014



U.S. Photovoltaic Installations, Q1 2010-Q1 2015



Rest of World: Years of Full Retail Market Opening

| Country | Year | Country | Year |
|----------------|------|----------------|------|
| Australia | 2002 | Italy | 2002 |
| Austria | 2001 | Korea | 2001 |
| Belgium | 2007 | Netherlands | 2001 |
| Czech Republic | 2006 | New Zealand | 1994 |
| Denmark | 2003 | Norway | 1997 |
| Finland | 1998 | Poland | 2007 |
| France | 2007 | Portugal | 2006 |
| Germany | 1998 | Spain | 2003 |
| Greece | 2007 | Sweden | 1996 |
| Hungary | 2000 | Turkey | 2003 |
| Ireland | 2000 | United Kingdom | 1999 |

Competition in Retail Electricity Service in the European Union, 2010 (1)

| | Member State | # of Main Suppliers | Mkt Share of Main Suppliers | Mkt Share of Largest Supplier |
|---|----------------|---------------------|-----------------------------|-------------------------------|
| Unconcentrated Markets: | | | | |
| | Austria | 8 | 69% | 17% |
| | Finland | 4 | 45% | 17% |
| | Germany | 3 | 25% | 14% |
| | Sweden | 3 | 45% | 19% |
| Moderately Concentrated Markets: | | | | |
| | Denmark | 3 | 59% | 46% |
| | Netherlands | 4 | 79% | 32% |
| | Slovenia | 5 | 99% | 36% |
| | United Kingdom | 6 | 85% | 24% |
| Highly Concentrated Markets: | | | | |
| | Belgium | 4 | 89% | 61% |
| | Czech Republic | 3 | 87% | 52% |
| | Hungary | 4 | 99% | 45% |
| | Ireland | 3 | 98% | 60% |
| | Luxembourg | 2 | 85% | 68% |
| | Slovakia | 4 | 98% | 35% |
| | Spain | 3 | 92% | 41% |

Competition in Retail Electricity Service in the European Union, 2010 (2)

| | Member State | # of Main Suppliers | Mkt Share of Main Suppliers | Mkt Share of Largest Supplier |
|---|--------------|---------------------|-----------------------------|-------------------------------|
| National or Regional Monopolies: | | | | |
| | Bulgaria | 3 | 100% | RM |
| | Cyprus | 1 | 100% | 100% |
| | Estonia | 1 | 94% | 94% |
| | France | 1 | 92% | 92% |
| | Greece | 1 | 100% | 100% |
| | Italy | 1 | 85% | 85% |
| | Latvia | 1 | 99% | 99% |
| | Lithuania | 2 | 94% | RM |
| | Malta | 1 | 100% | 100% |
| | Poland | 6 | 88% | RM |
| | Portugal | 1 | 93% | 93% |
| | Romania | 4 | 100% | RM |

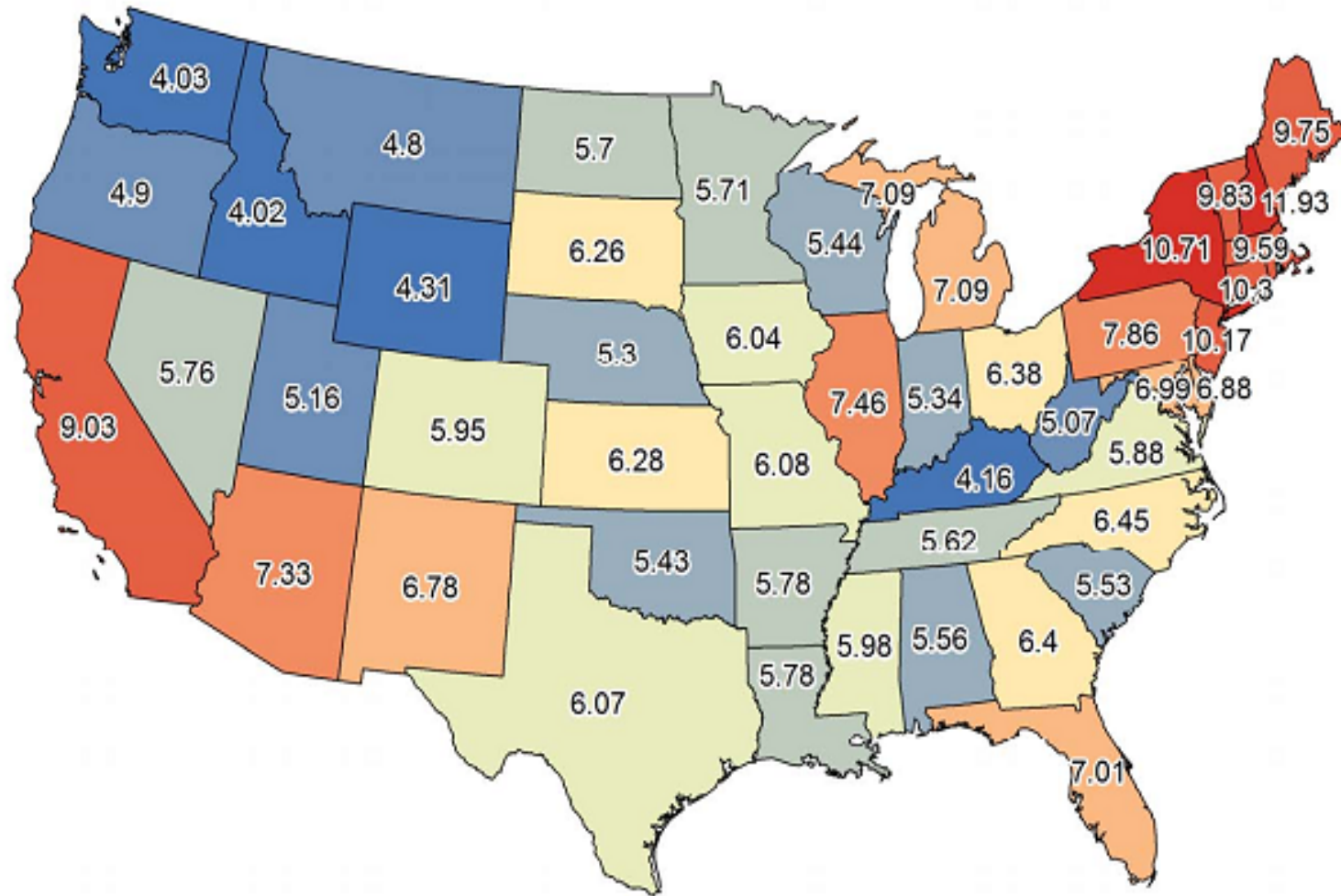


HISTORY OF RETAIL CHOICE

Goals of Retail Choice

- ❑ Price reductions due to:
 - Efficiency improvements
 - Capture of economic rents
- ❑ Wider customer choice in terms of:
 - Energy source
 - Firmness of service
 - Variability of price over time
 - Duration and degree of price guarantee
 - Billing and payment arrangements
 - Bundling with complementary products
- ❑ Promotion of alternative resource technologies

Average Retail Prices by State, 1998 (cents per kWh)



Timing of State Retail Choice Initiation and Suspension

| State | Year Initiated | Year Suspended | State | Year Initiated | Year Suspended |
|---------------|----------------|----------------|---------------|----------------|----------------|
| Arkansas | 1999 | 2003 | New Hampshire | 1996 | |
| Arizona | 1998 | 2004 | New Jersey | 1997 | |
| California | 1996 | 2001 | New Mexico | 1999 | 2003 |
| Connecticut | 1998 | | New York | 1996 | |
| D.C. | 2000 | | Nevada | 1997 | 2001 |
| Delaware | 1999 | | Ohio | 1999 | |
| Illinois | 1997 | | Oregon | 1999 | 2002 |
| Massachusetts | 1997 | | Pennsylvania | 1996 | |
| Maryland | 1997 | | Rhode Island | 1996 | |
| Maine | 1997 | | Texas | 2001 | |
| Michigan | 1999 | | Virginia | 1998 | 2007 |
| Montana | 1997 | 2002/2003 | | | |



IMPLEMENTATION CHALLENGES

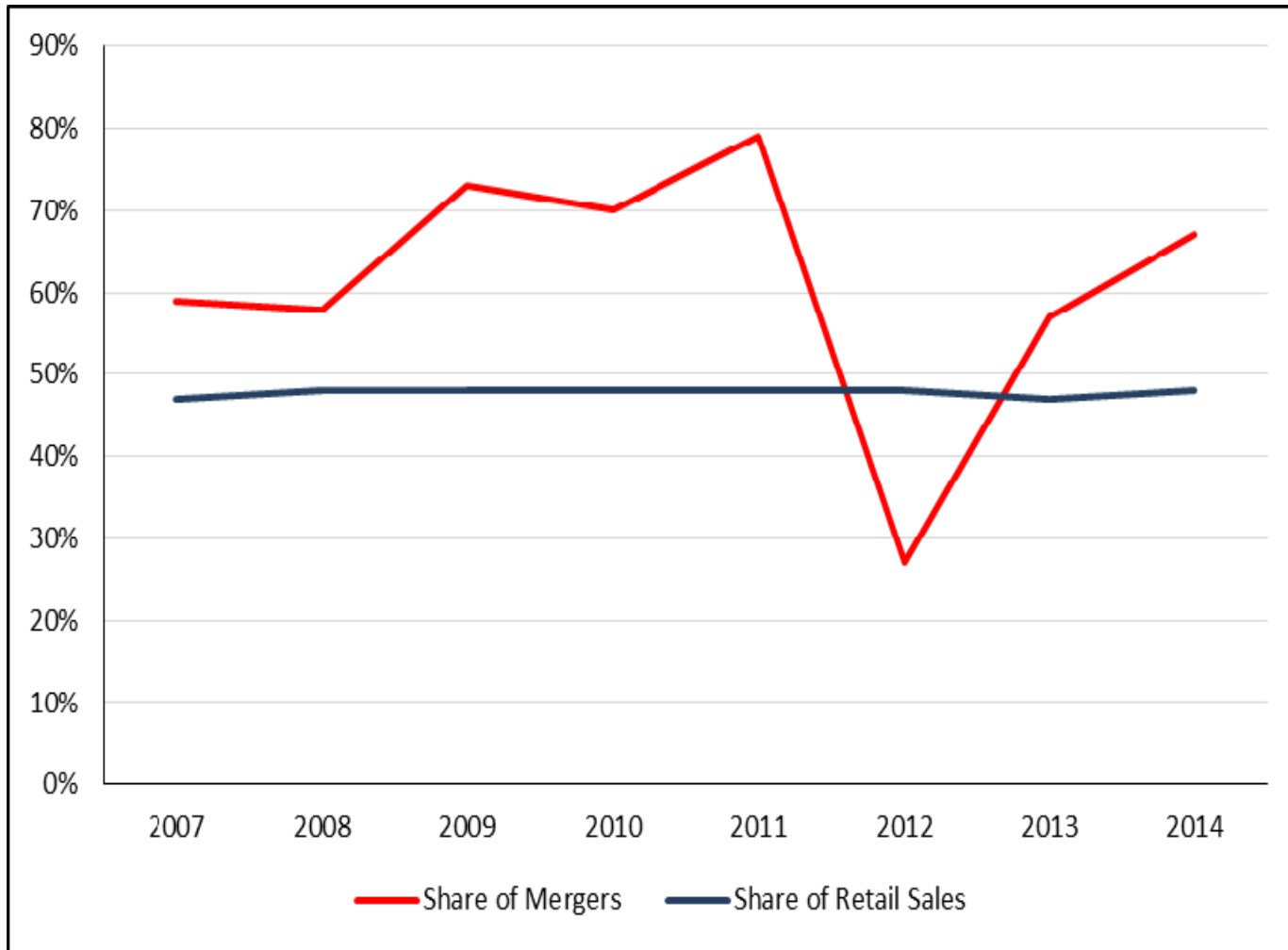
Implementation Challenges

- ❑ Restructuring utility organizations
- ❑ Adapting utility power operations
- ❑ Addressing other challenges:
 - Timing of retail choice
 - Retail rate controls
 - Default and Provider of last resort service
 - Generation asset divestiture and stranded cost treatment
 - Market rules for utility affiliates
 - Protection for low-income consumers

States Divesting Generation Assets

| State | Number of Plants | Percent Divested | Year Divested | Retail Choice? | State | Number of Plants | Percent Divested | Year Divested | Retail Choice? |
|---------------|------------------|------------------|---------------|----------------|---------------|------------------|------------------|---------------|----------------|
| California | 29 | 44% | 1998 | Y | New Hampshire | 3 | 100% | 2006 | Y |
| Connecticut | 13 | 80% | 2000 | Y | New Jersey | 27 | 50% | 2000 | Y |
| Delaware | 7 | 100% | 2001 | Y | New York | 32 | 54% | 1999 | Y |
| D.C. | 2 | 100% | 2001 | Y | Ohio | 2 | 8% | 2000 | Y |
| Illinois | 37 | 58% | 2000 | Y | Pennsylvania | 60 | 40% | 1999/2000 | Y |
| Indiana | 2 | 5% | 1998 | N | Rhode Island | 1 | 100% | 1998 | Y |
| Kentucky | 5 | 20% | 1998 | N | Texas | 3 | 3% | 2001 | Y |
| Maine | 3 | 100% | 1999 | Y | Vermont | 5 | 55% | 2001 | N |
| Maryland | 19 | 70% | 2001 | Y | Virginia | 3 | 5% | 2001 | Y |
| Massachusetts | 34 | 100% | 1998 | Y | Washington | 2 | NA | 2000 | N |
| Montana | 14 | 95% | 2000 | Y | West Virginia | 1 | 10% | 2000 | N |
| Nevada | 10 | 52% | 2000 | Y | | | | | |

Shares of Electric Industry Mergers and Sales in Retail Choice States, 2007-2014





IMPACTS ON CUSTOMER SERVICE

Numbers of Customers Participating in Dynamic Pricing Programs, by Customer Segment, 2014

| State Type | Residential | Commercial | Industrial | Total |
|---------------|-------------|------------|------------|-----------|
| Traditional | 1,078,298 | 243,599 | 27,531 | 1,349,428 |
| Retail Choice | 3,308,180 | 1,159,483 | 62,258 | 4,529,921 |
| Suspended | 968,599 | 43,895 | 4,472 | 1,016,966 |

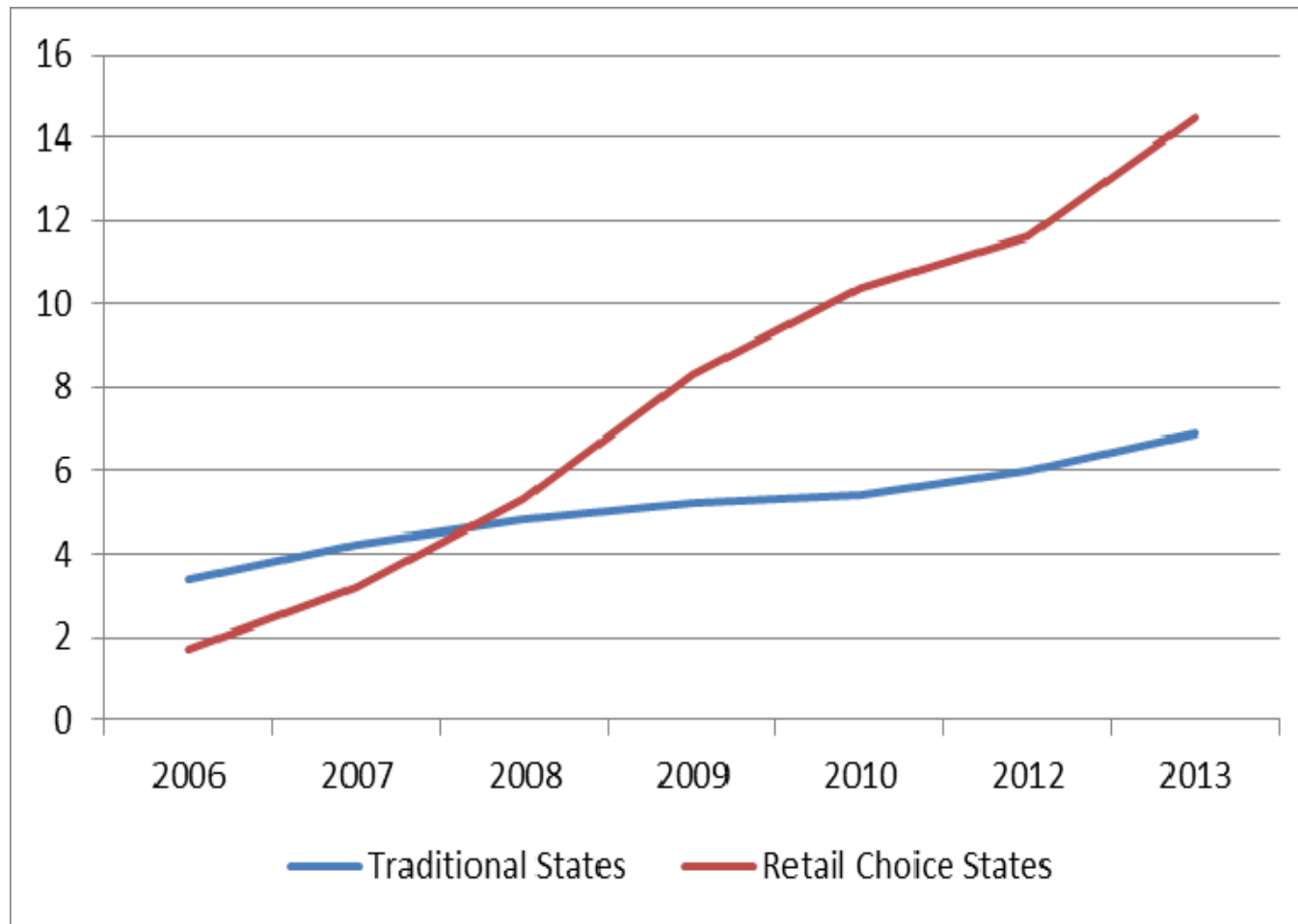
Demand Response Program Outcomes, 2014

| State Type | Residential | | | Commercial | | | Industrial | | |
|---------------|-------------|----------------|-------|------------|----------------|-------|------------|----------------|-------|
| | Custs | Annual Savings | | Custs | Annual Savings | | Custs | Annual Savings | |
| | (000s) | GWh | % | (000s) | GWh | % | (000s) | GWh | % |
| Traditional | 4,246 | 135 | 0.02% | 102 | 57 | 0.01% | 22 | 78 | 0.02% |
| Retail Choice | 3,141 | 38 | 0.01% | 478 | 222 | 0.03% | 24 | 12 | 0.00% |
| Suspended | 1,008 | 707 | 0.51% | 24 | 183 | 0.14% | 11 | 2 | 0.00% |

Smart Meter Installation and Penetration in the United States, 2006-2014

| State Type | 2006 | 2008 | 2013 | 2014 |
|---------------|------|------|-------|-------|
| Traditional | 0.8% | 4.6% | 45.0% | 43.6% |
| Retail Choice | 0.3% | 3.9% | 24.0% | 22.2% |
| Suspended | 0.7% | 2.7% | 37.8% | 36.7% |

Green Pricing Customers and Sales (GWh) by State Type



Customer Satisfaction: JD Power Survey (1)

- RC customers are more satisfied with price than customers of local electric utilities
 - Customer satisfaction is tied to price perception, which is shaped by the level of price volatility
 - Price satisfaction is higher under fixed-price contracts than under variable-price contracts.
 - Satisfaction is lower in aggregation programs than when the customer chooses their provider.

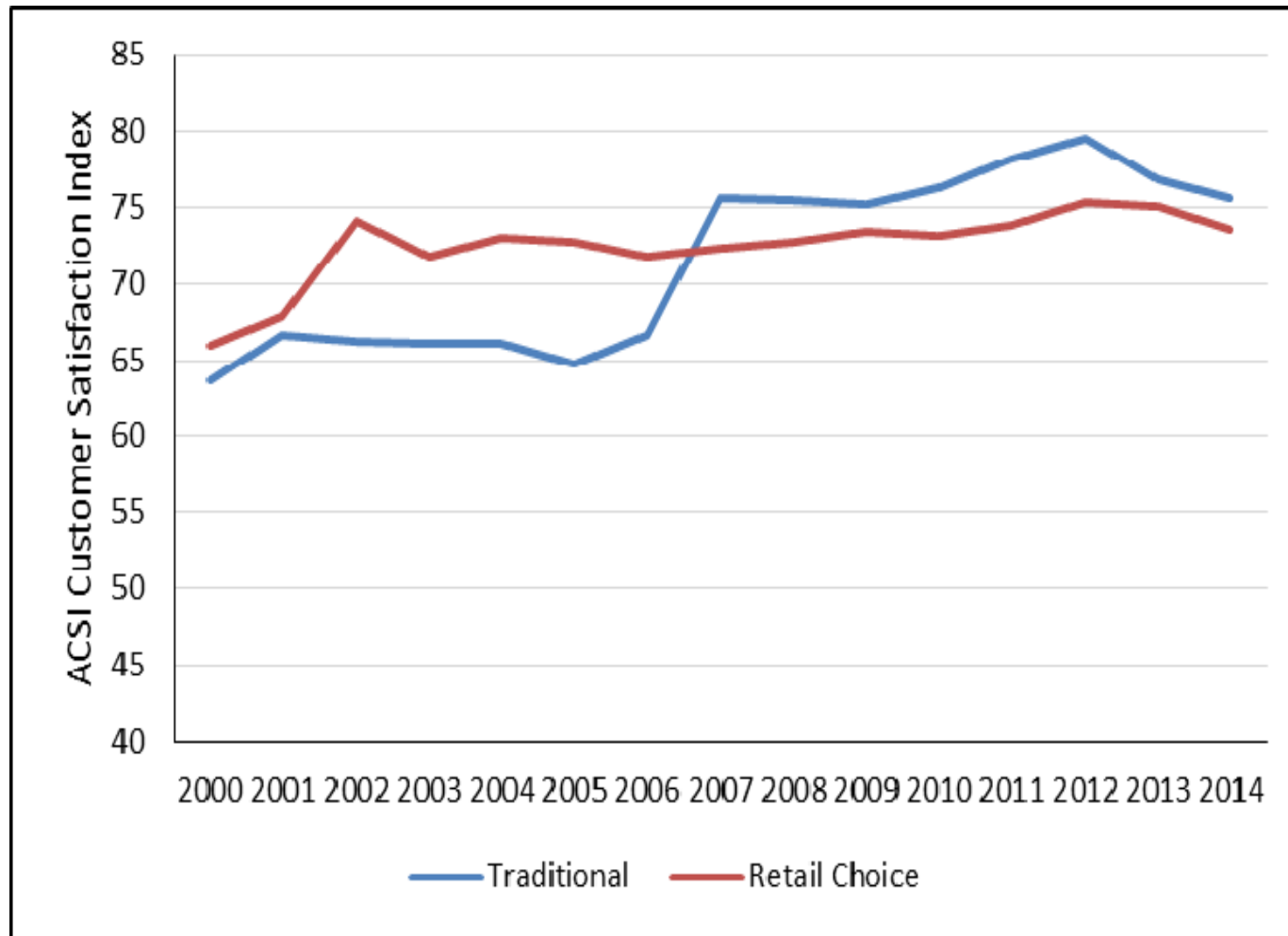
Customer Satisfaction: JD Power Survey (2)

- ❑ Residential customers do not switch to alternative retail providers because:
 - Savings are not large enough: one fourth would switch for \$20 cut in monthly bill.
 - Satisfied with incumbent utility.
 - Lack of knowledge about how to switch.
 - Fear service quality would decline.
- ❑ Residential electric customers' satisfaction with the overall price of service increases substantially as customers become more familiar with available energy efficiency programs.

Customer Satisfaction: JD Power Survey (3)

- Satisfied customers
 - 57% “definitely will” renew their contract
 - 62% “definitely will” recommend their provider
- Dissatisfied customers
 - 21% “definitely will” renew
 - 3% “definitely will” recommend their provider

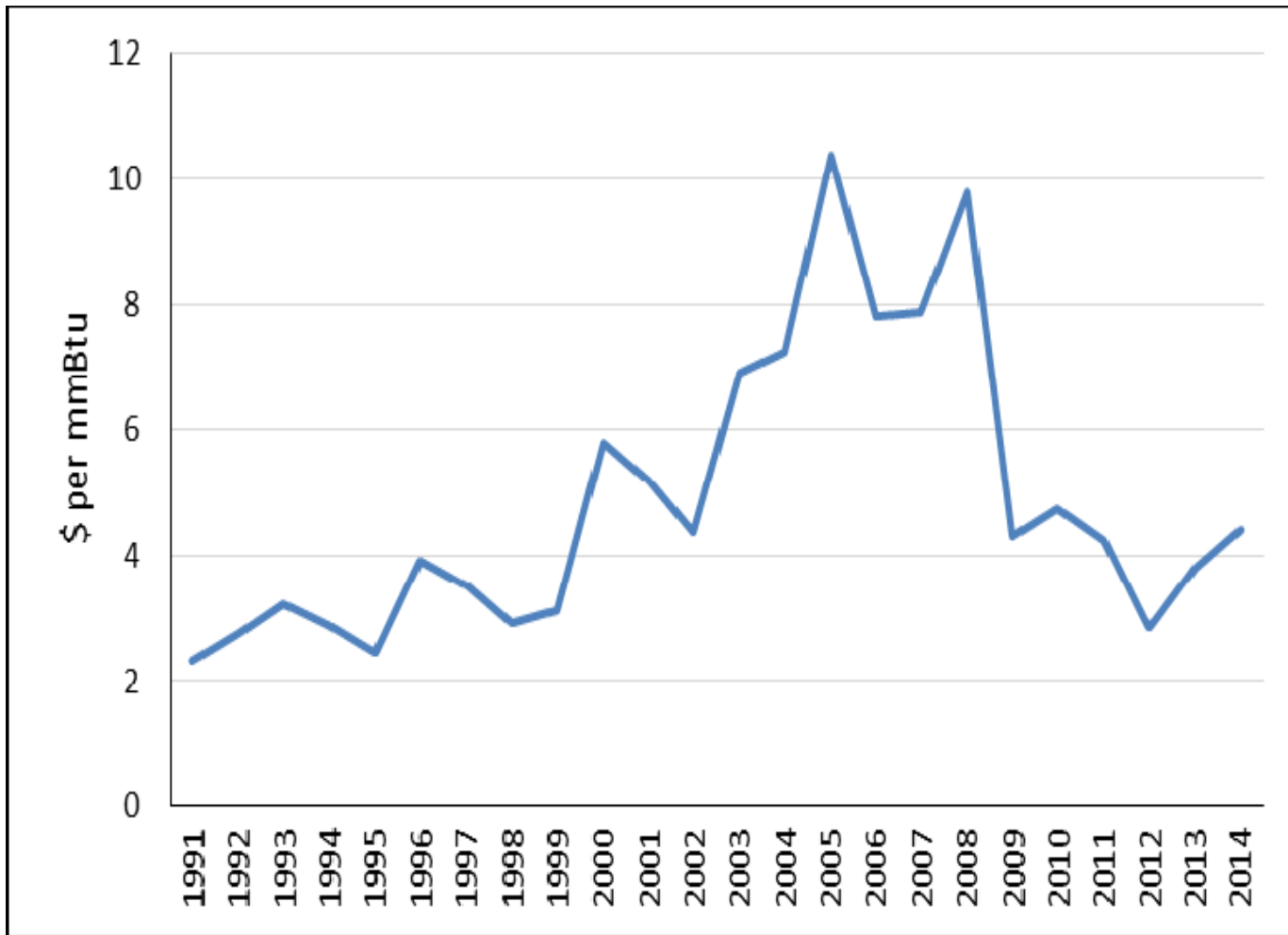
Average ACSI Scores for Traditional and Retail Choice States IOUs, 2000-2014



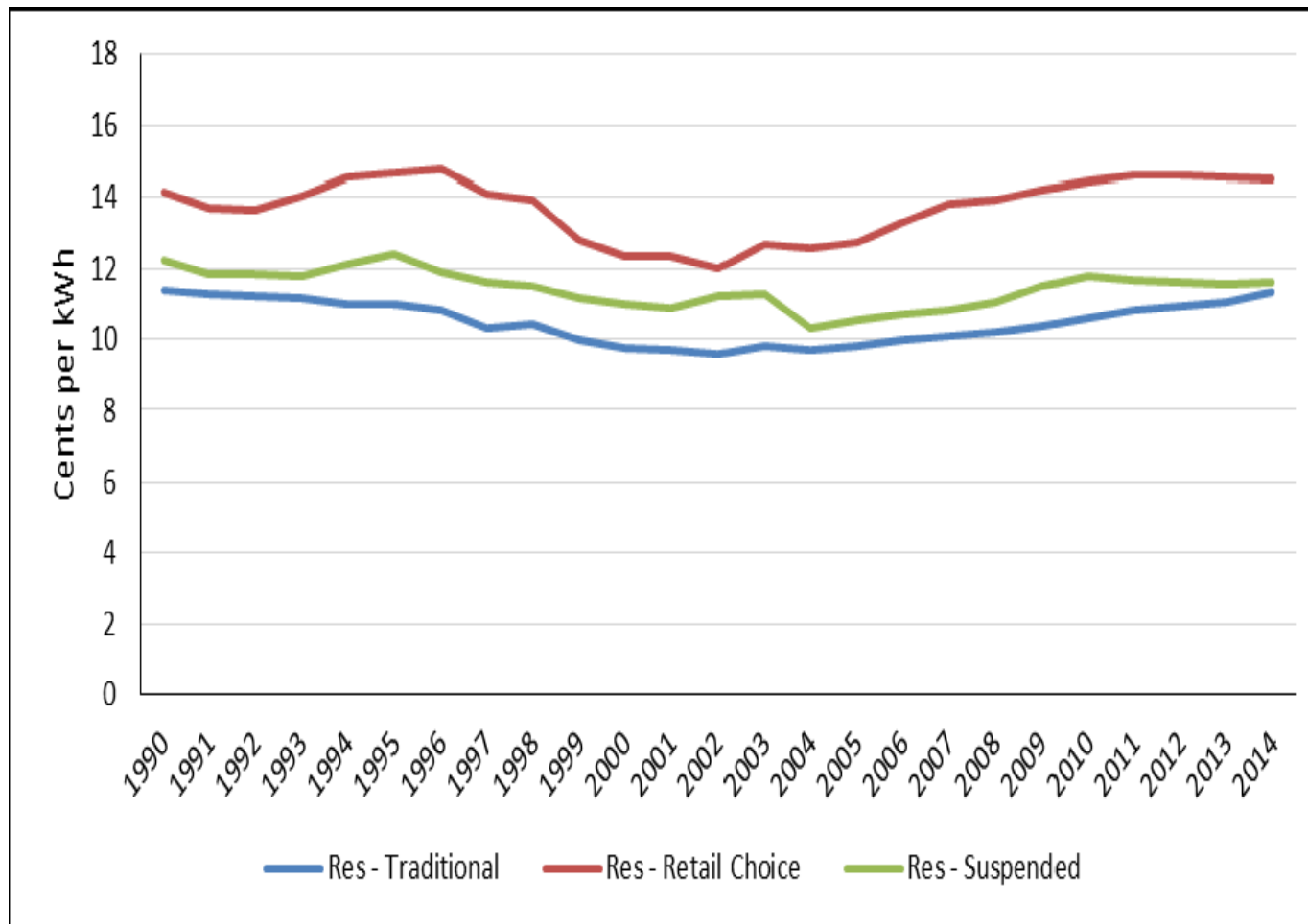


IMPACTS ON PRICES

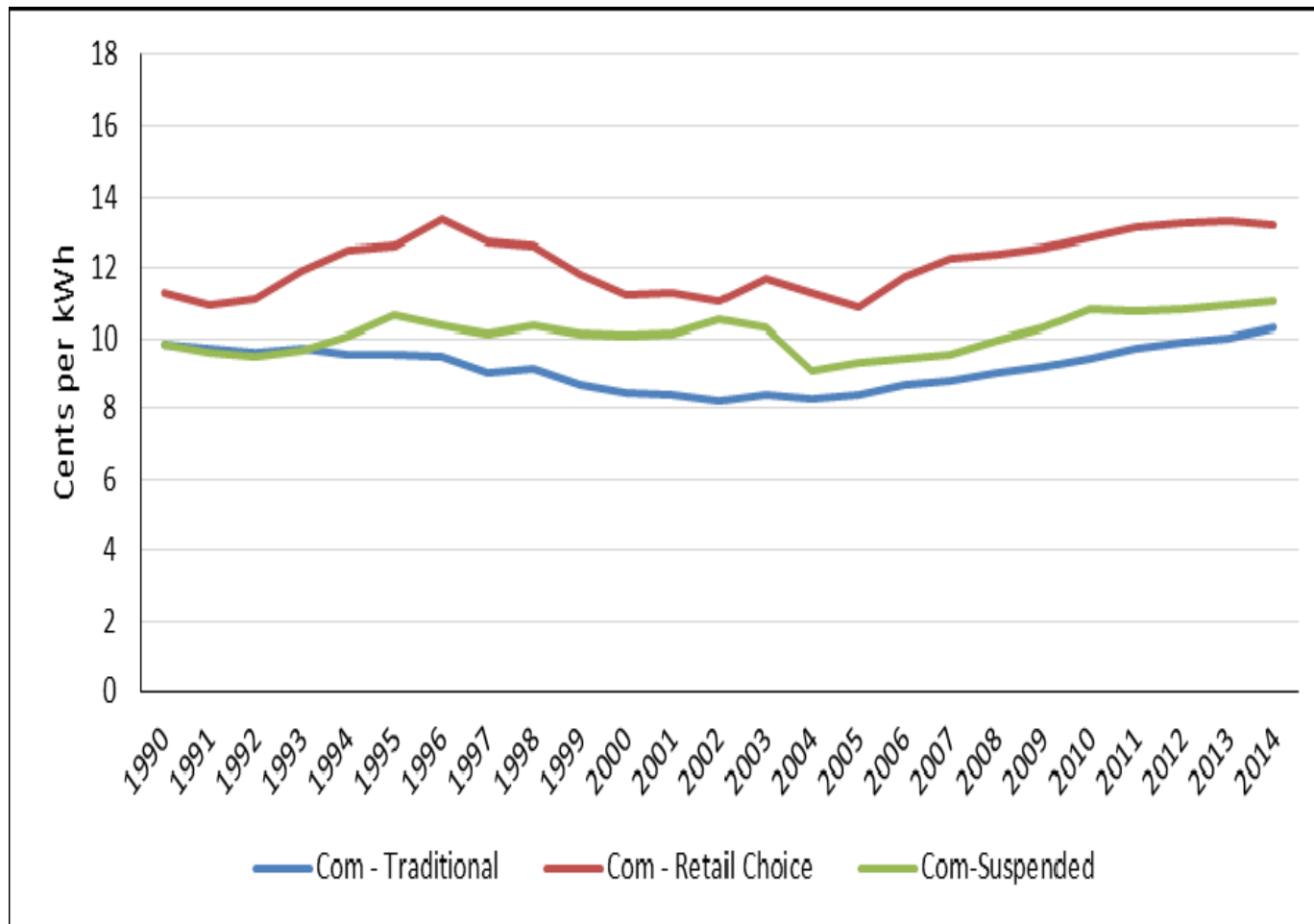
Real Annual Henry Hub Natural Gas Spot Prices, 1991-2014 (2015 dollars)



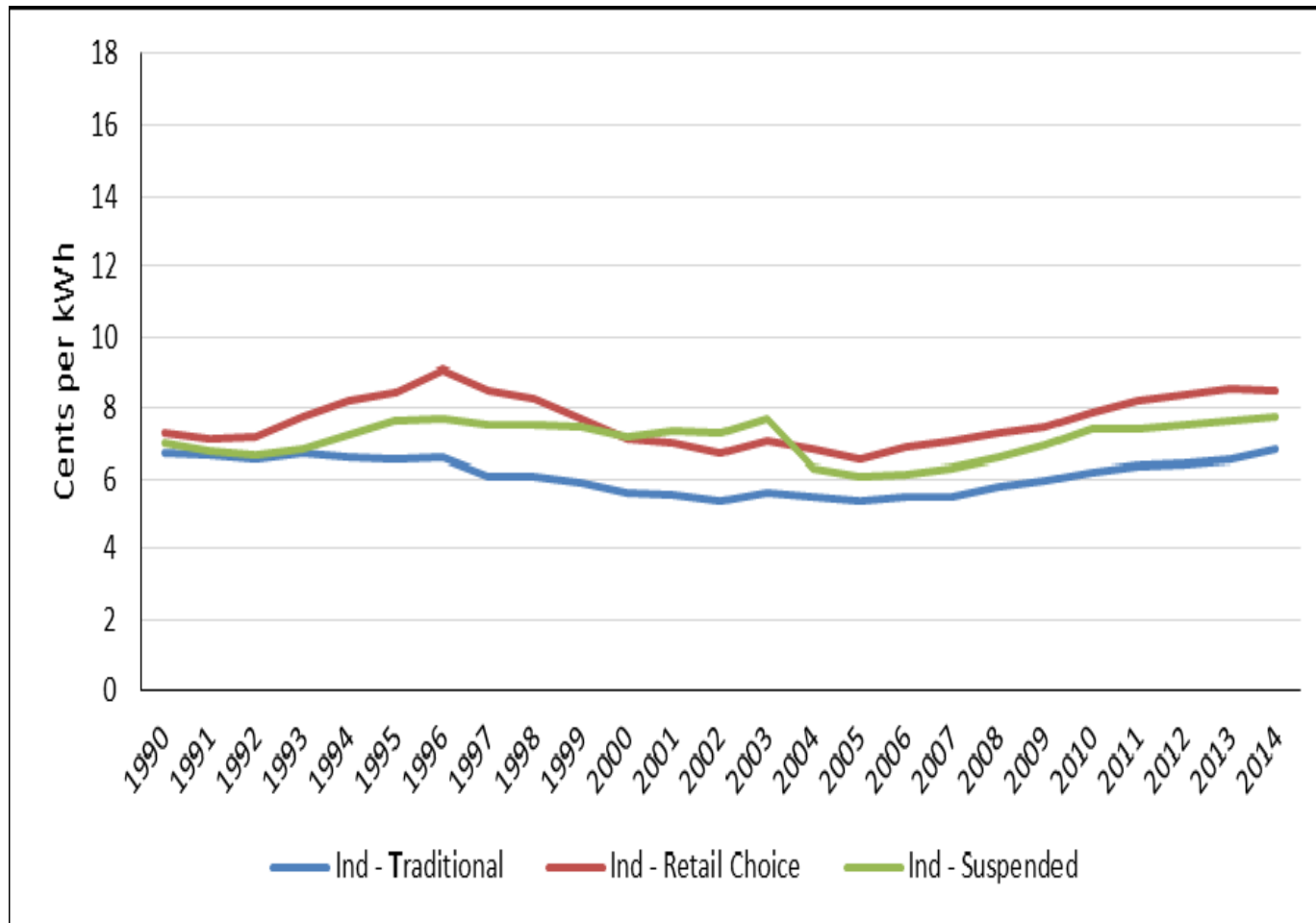
Weighted Average Real Electricity Prices for Residential Customers, 1990-2014 (2015 dollars)



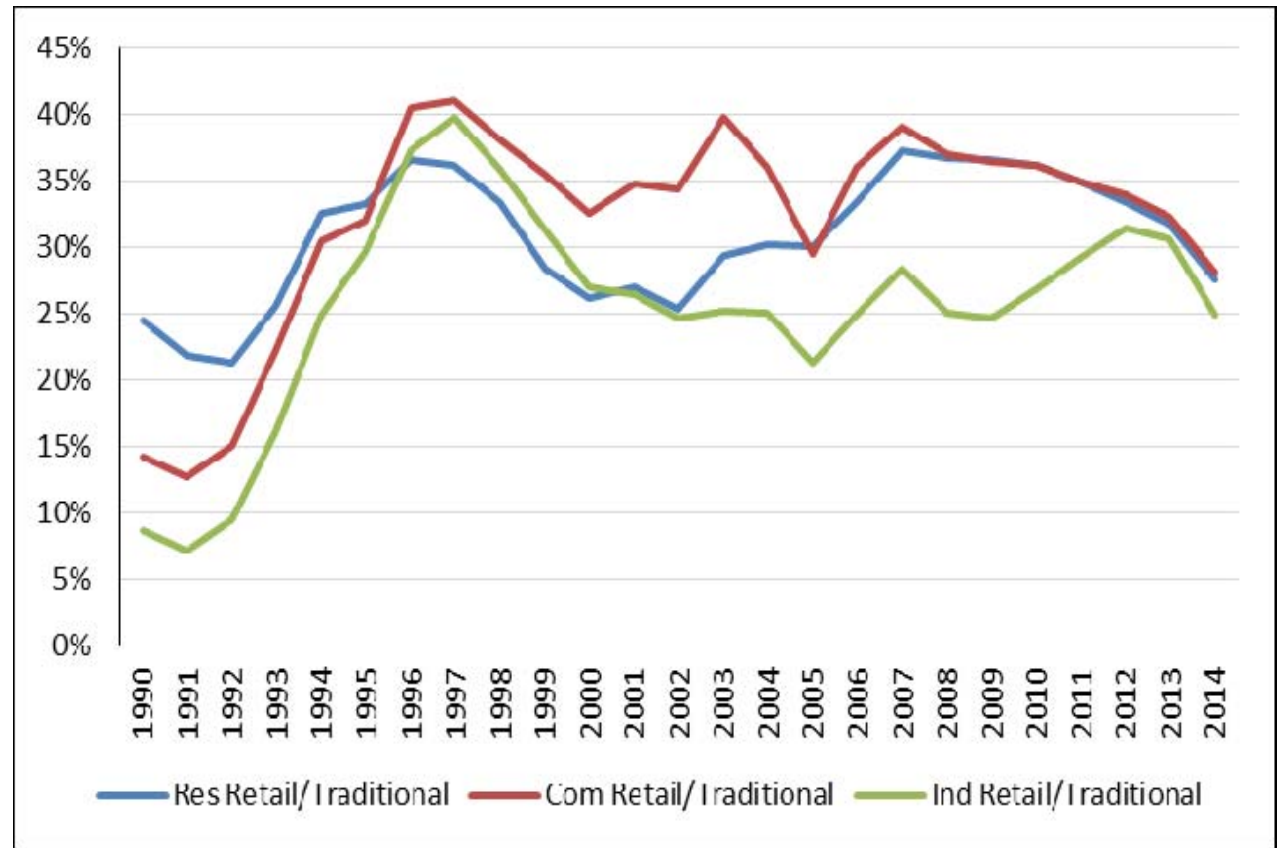
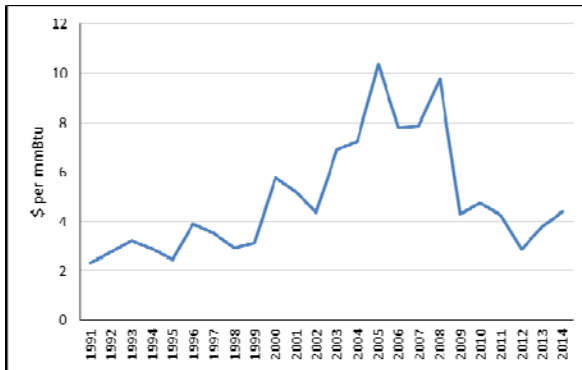
Weighted Average Real Electricity Prices for Commercial Customers, 1990-2014 (2015 dollars)



Weighted Average Real Electricity Prices for Industrial Customers, 1990-2014 (2015 dollars)



Amounts by Which Average Revenues in Retail Choice States Exceeded Those in Traditionally Regulated States, 1990-2014



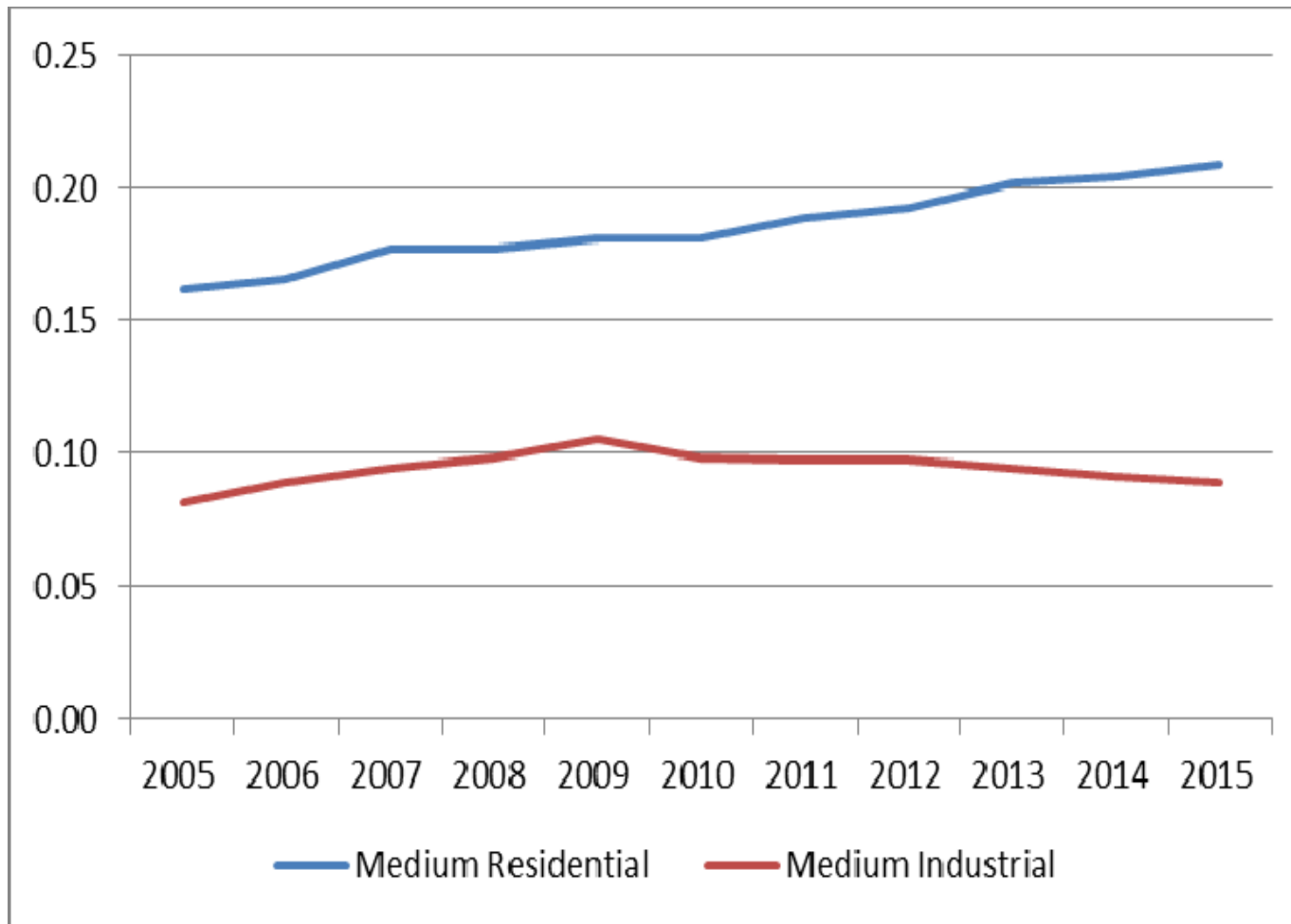
Percentage Changes in Average Real Retail Prices, 1990-2014

| State Group | Residential | Commercial | Industrial |
|---------------|-------------|------------|------------|
| Traditional | 0% | - 4% | - 2% |
| Retail Choice | -2% | -15% | -14% |
| Suspended | 6% | -11% | -10% |

Typical Bills per the LES Survey Results, 2015

| Class | Demand (kW) | Monthly Energy (kWh) | Monthly Bill (\$) | | Diff. |
|-------------|-------------|----------------------|-------------------|----------|-------|
| | | | Trad. State | RC State | |
| Residential | | 500 | 64 | 88 | 38% |
| | | 1,000 | 118 | 169 | 43% |
| Commercial | 40 | 10,000 | 1,138 | 1,593 | 40% |
| | 40 | 14,000 | 1,441 | 2,021 | 40% |
| | 500 | 150,000 | 15,304 | 23,119 | 51% |
| | 500 | 180,000 | 17,062 | 26,399 | 55% |
| Industrial | 75 | 15,000 | 1,856 | 2,542 | 37% |
| | 75 | 30,000 | 2,851 | 4,130 | 45% |
| | 75 | 50,000 | 4,051 | 6,159 | 52% |
| | 1,000 | 200,000 | 23,821 | 34,989 | 47% |
| | 1,000 | 400,000 | 35,368 | 56,284 | 59% |
| | 1,000 | 650,000 | 48,586 | 82,779 | 70% |

Average Real Electricity Prices for Residential and Industrial Electricity Customers in 27 EU Countries, 2005-2015 (2015 € per kWh)



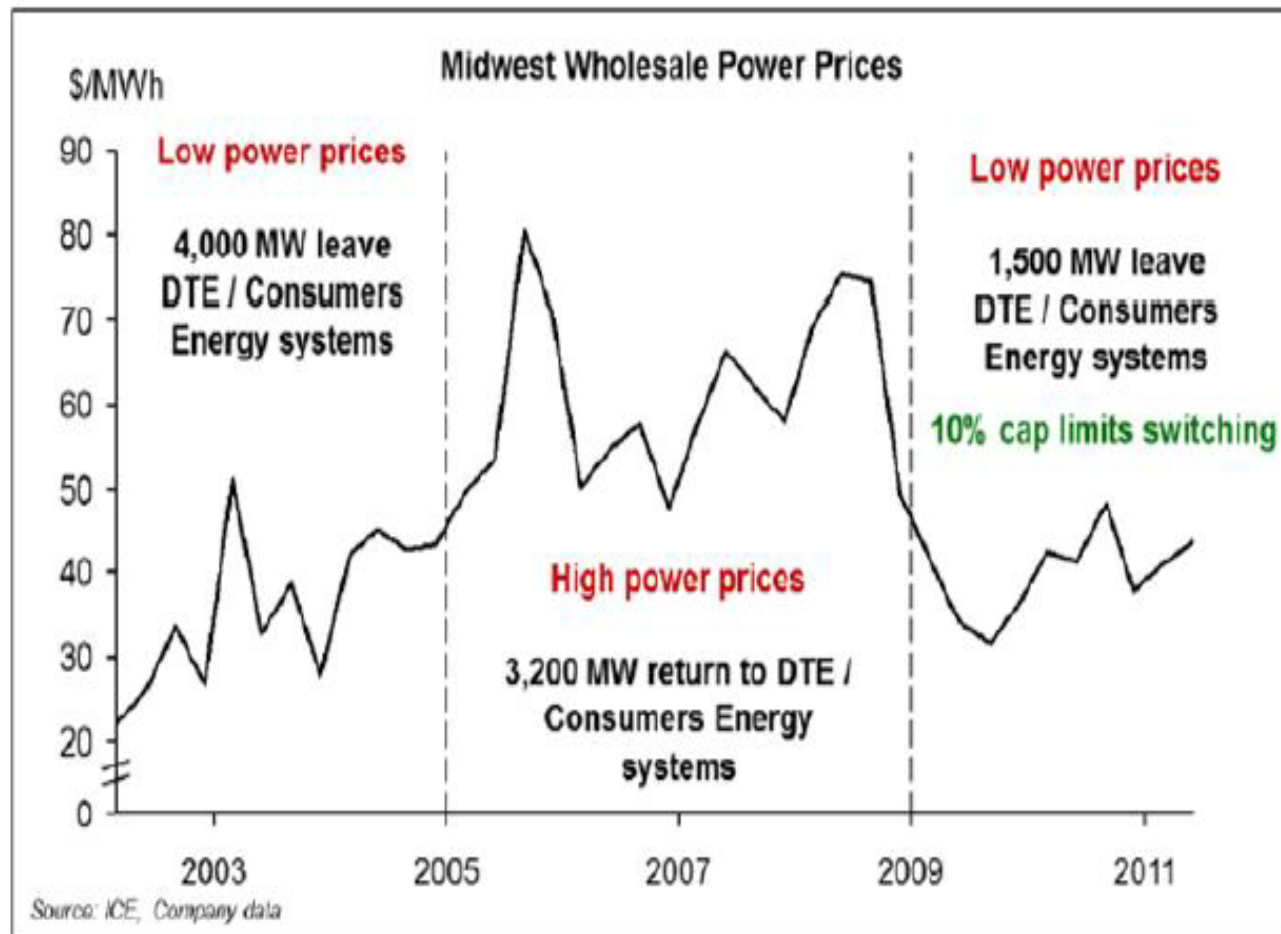
Statistical Studies Focused on Retail Choice

- ❑ RC has reduced retail prices.
- ❑ RC has increased retail prices.
- ❑ RC has reduced retail prices in states with high participation rates and raised retail prices in states with low participation rates.
- ❑ Restructuring and RC have improved generating plant efficiencies.

Statistical Studies Focused on Restructuring in General

- ❑ Restructuring :
 - has provided substantial consumer benefits and/or significantly lower consumer prices;
 - has not significantly affected customers' prices;
 - has increased wholesale prices.
- ❑ Consumers in PJM have enjoyed savings due to restructuring.

Cost Shifting



Investment Risk Impacts

- RC adds to the financial uncertainties faced by investors in generating resources.
 - Under RC, sales contracts have durations that are only small fractions of generators' lives.
 - The consequent revenue uncertainty makes:
 - investment in new generation less attractive
 - long-term fuel contracting less attractive.
- The foregoing uncertainties:
 - raise the required returns on investment, and
 - may impinge upon resource adequacy.

Impacts on Demographic Groups

- ❑ RC causes greater locational variation in retail prices.
- ❑ RC may disproportionately benefit well educated, high-income, white, urban customers.
- ❑ Concerns over low residential switching rates are misplaced.



CONCLUSIONS

RC's Benefits are Ambiguous

- There is little evidence that RC has yielded significant benefits beyond those from wholesale competition.
 - Price impacts are ambiguous.
 - Service options may be greater.
 - Participation in dynamic pricing programs is greater.
 - Consumer risks are greater.

Directions for Future Policy

- ❑ RC's benefits should be measured by the value it adds, not by switching rates.
 - Customers should not be forced to switch.
 - Competitors should not be subsidized.
- ❑ In all states, generation services should be unbundled from other services.
- ❑ In RC states, utilities should offer real-time pricing to all customers willing to pay metering and billing costs.