



Infrastructure and capacity: challenges for development.

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Power grid uses and expectations

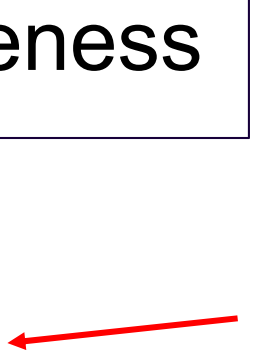
Traditional Infrastructure Expectations

Safety
Reliability
Cost Effectiveness

Emerging Infrastructure Expectations

Safety
Reliability
End use efficiency
Flexibility
Adaptability/Resiliency
Environmental
Security (Physical/Cyber)

Increasing emphasis on the development of **“social” capital** – the development of infrastructure to meet social and policy needs.



Efficiency and current policy agendas

How is this **social capital/infrastructure investment** addressing perceived market failures?

- Renewables (externalities)
- Safety/reliability (externalities, public goods)
- Environmental (externalities)
- Energy efficiency (imperfect info, risk/uncertainty)

The regulatory challenge is that these policies' benefits, by definition, **do not have an easily-measured market value**. Just about **any benefit estimate can be used to justify any level of investment**. How do you know the investment has been cost-effective?

Today, **prices continue to increase despite the fact that the commodity cost of the energy being transformed and/or delivered has been decreasing**.

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This is an issue already getting recognized, to a certain extent, by media.

Utilities' Profit Recipe: Spend More

To expand regulator-imposed earnings caps, electricity producers splurge on new equipment, boosting customers' bills



Every time Southern California Edison replaces a 50-year-old pole with a new one, it has a fresh investment on which it is eligible to earn an annual profit. PHOTO: FRED PROUSER/REUTERS

By REBECCA SMITH
April 20, 2015 6:04 p.m. ET

101 COMMENTS

Families in New York are paying 40% more for electricity than they were a decade ago. Meanwhile, the cost of the main fuel used to generate electricity in the state—natural gas—has plunged 39%.

Why haven't consumers felt the benefit of falling natural-gas prices, especially since fuel accounts for at least a quarter of a typical electric bill?

One big reason: utilities' heavy capital spending. New York power companies poured \$17 billion into new equipment—from power plants to pollution-control devices—in the past decade, a spending surge that customers have paid for.

New York utilities' spending plans could push electricity prices up an additional 63% in the next decade, said Richard Kauffman, the former chairman of Levi Strauss & Co. who became New York's energy czar in 2013. It's "not a sustainable path for New York," he said.

Pricing Power Adds Pep to Equities



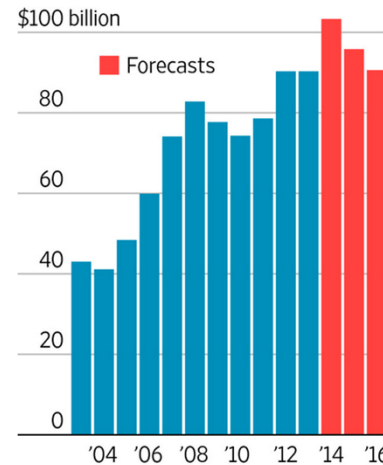
It's hard to find companies that increase earnings while global growth remains subdued. In this pricing power can help investor companies that are capable of sustainable growth. There are two components to it: growth, the top line, represents and the bottom line, driven by. For many companies, the best margins is to increase volume of what you already produce by.

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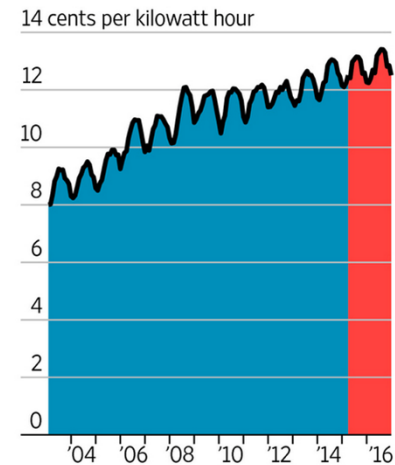
Power Gauge

Regulators are trying to rein in utilities' capital spending, which has ramped up over the past 10 years, driving up electricity prices.

Utility industry capital spending



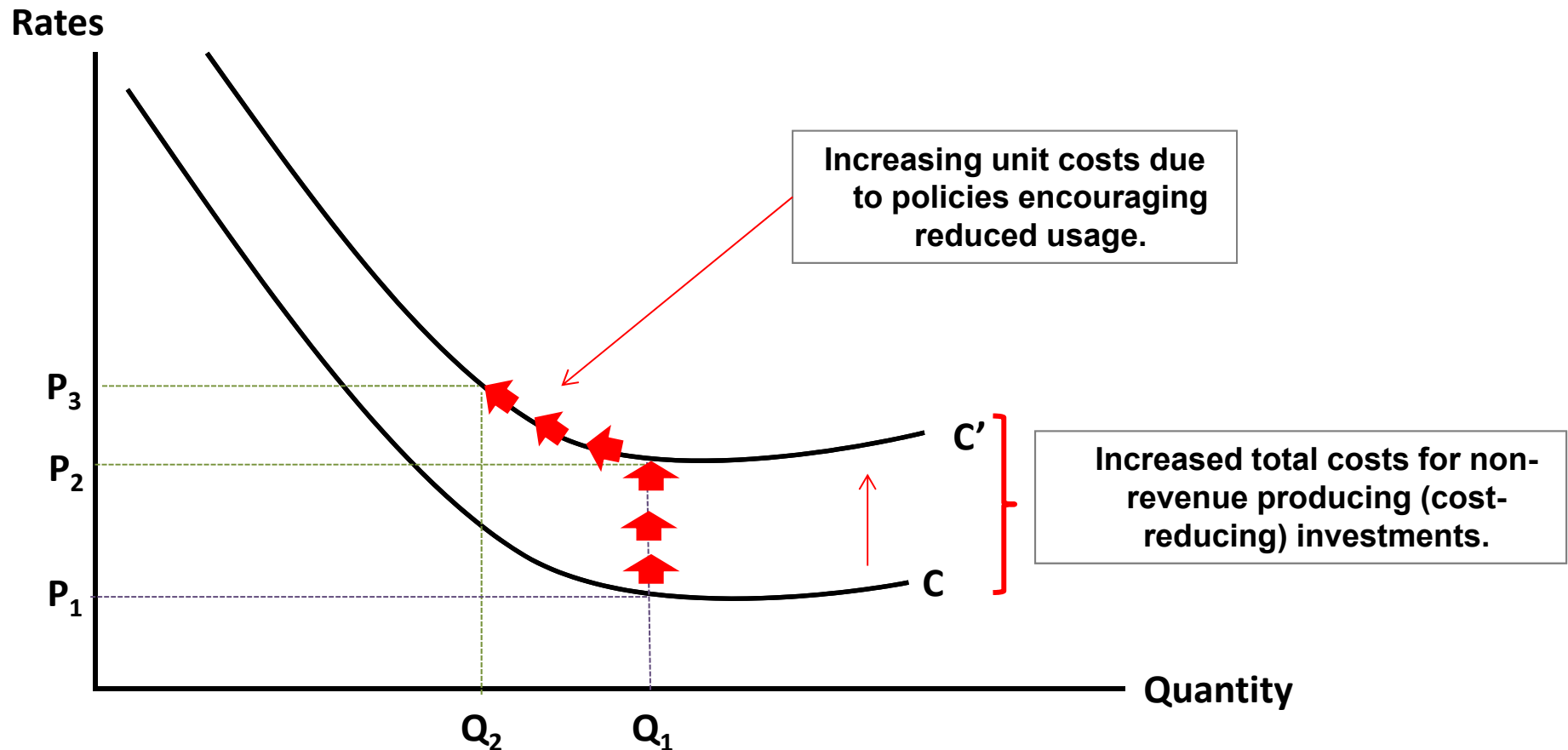
Residential electricity price



Sources: Edison Electric Institute (spending); Energy Dept. (prices) THE WALL STREET JOURNAL.

Current policy agendas: conceptual impacts

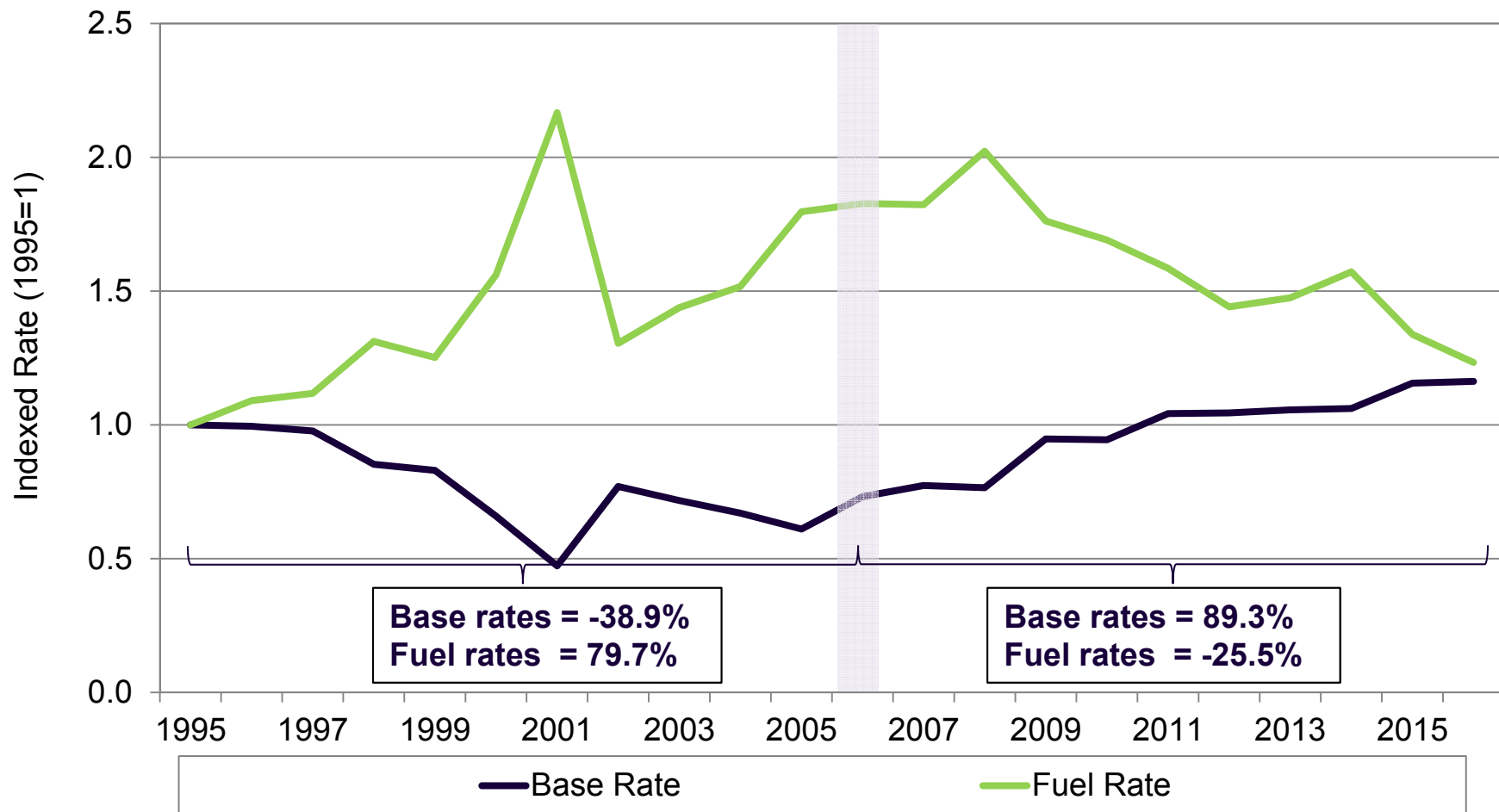
Current policy agendas are increasing rates through (a) a significant increase in non-growth related capital investment and (b) a reduction in system utilization through demand reductions and intermittent resources.



Rate Implications & Impacts

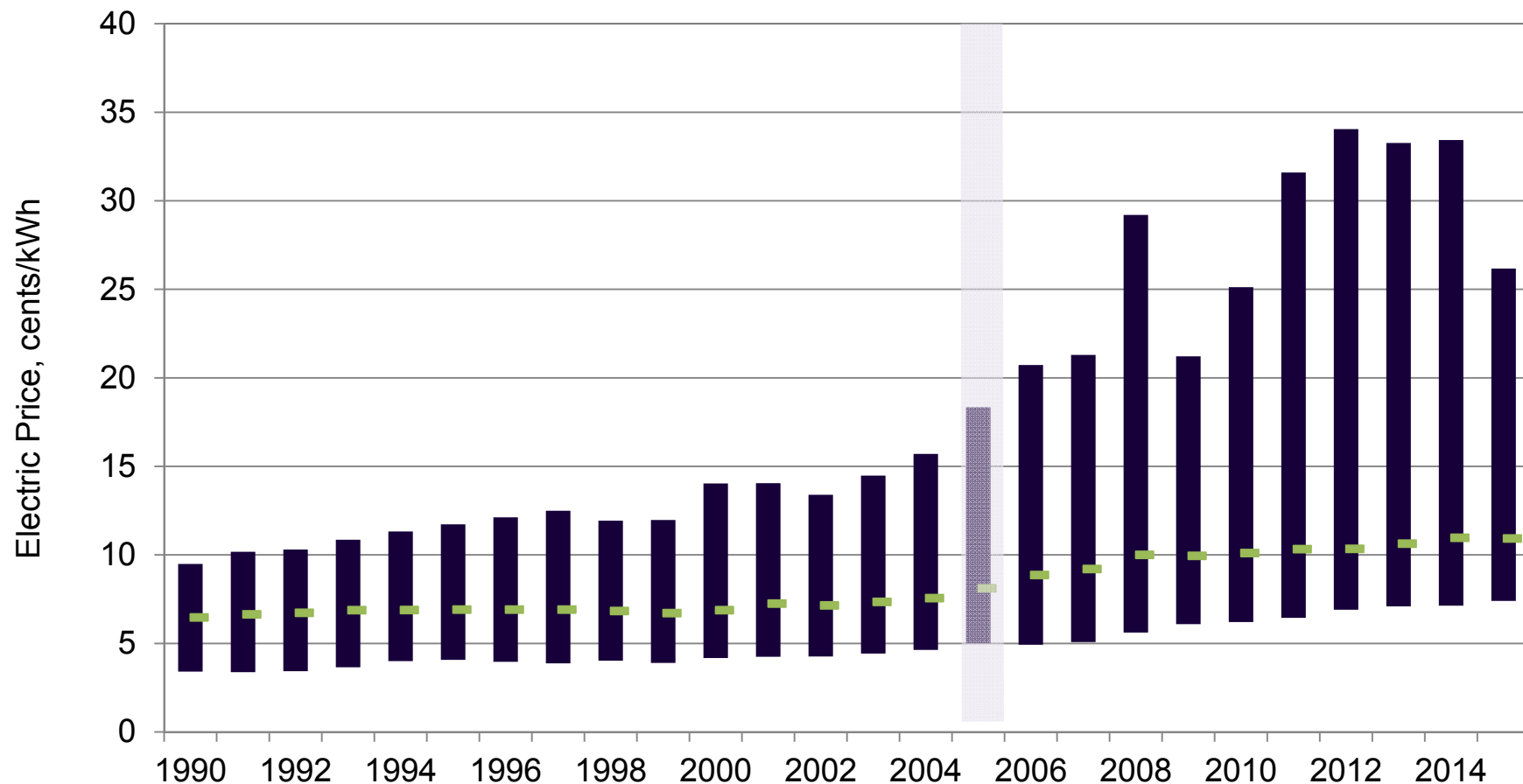
Annual percent change in base rate versus fuel rate – electric

Base rates (electric) have increased almost 90 percent since 2005, compared to fuel rates that have decreased over 25 percent.



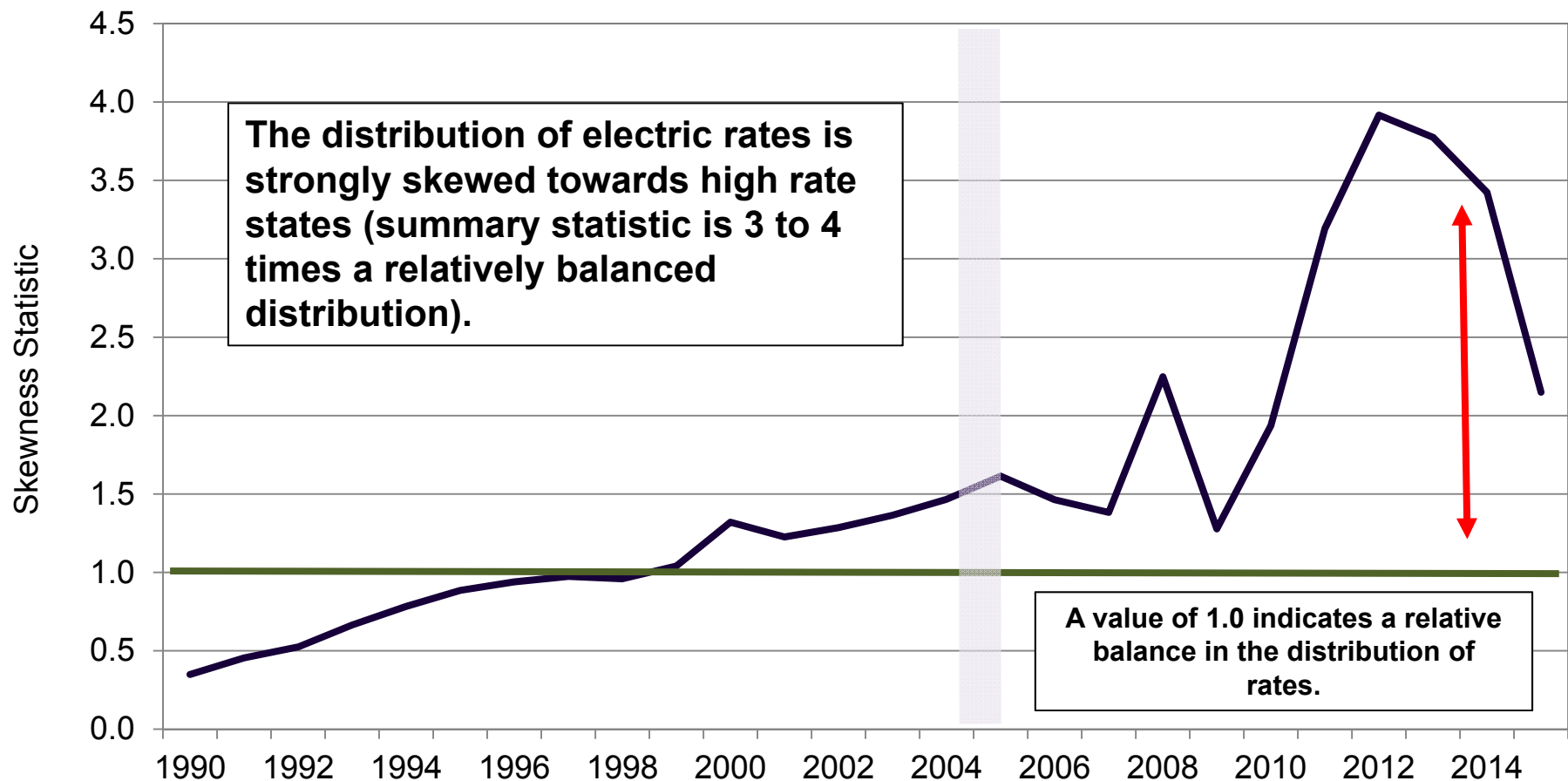
U.S. electric prices – range of prices

Simple “high-low” chart further illustrates the growing dispersion in retail electricity prices.



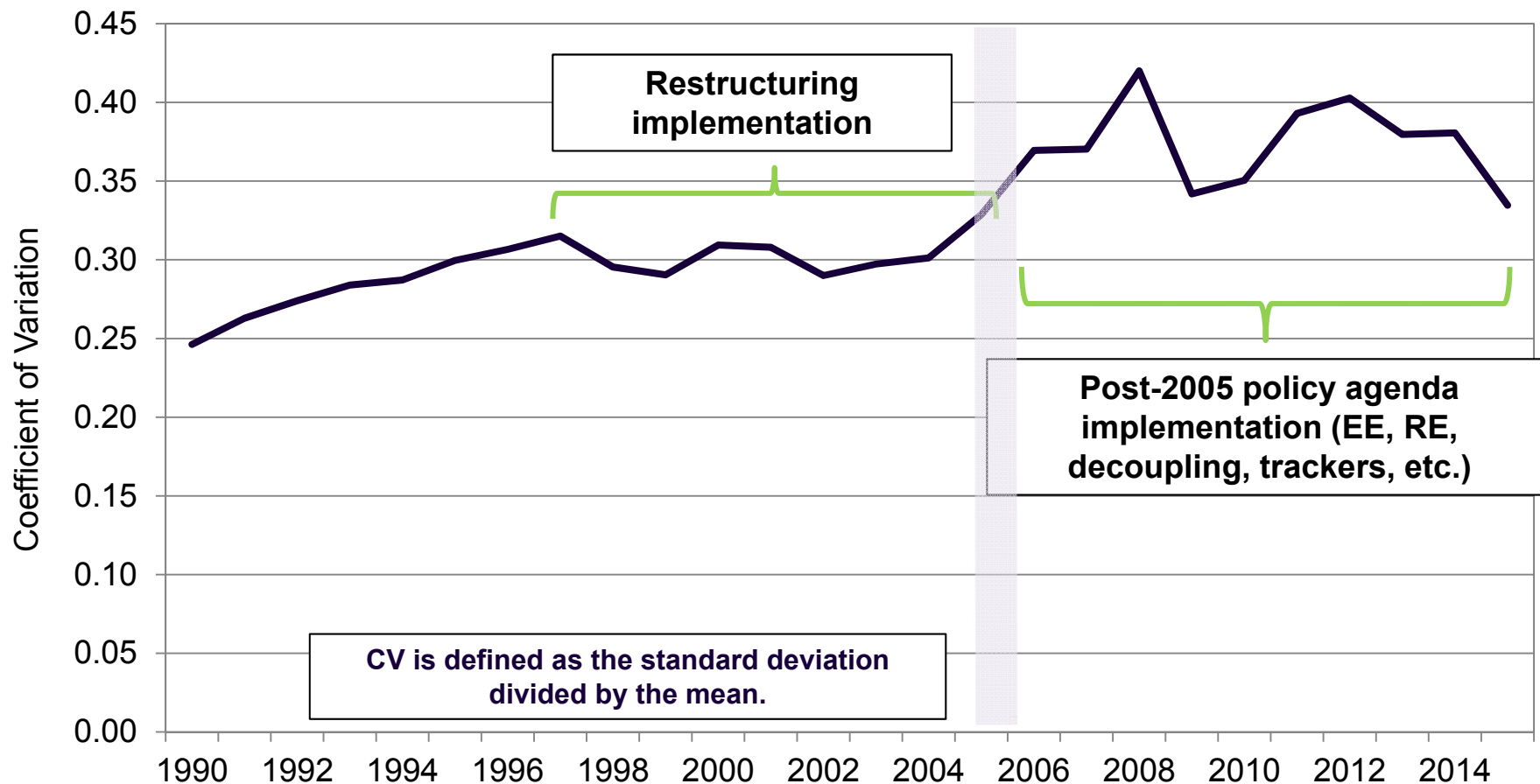
U.S. electric prices – skewness

The skewness in the distribution of utility rates is increasing rapidly indicating that states with higher rates are dominating the distribution.



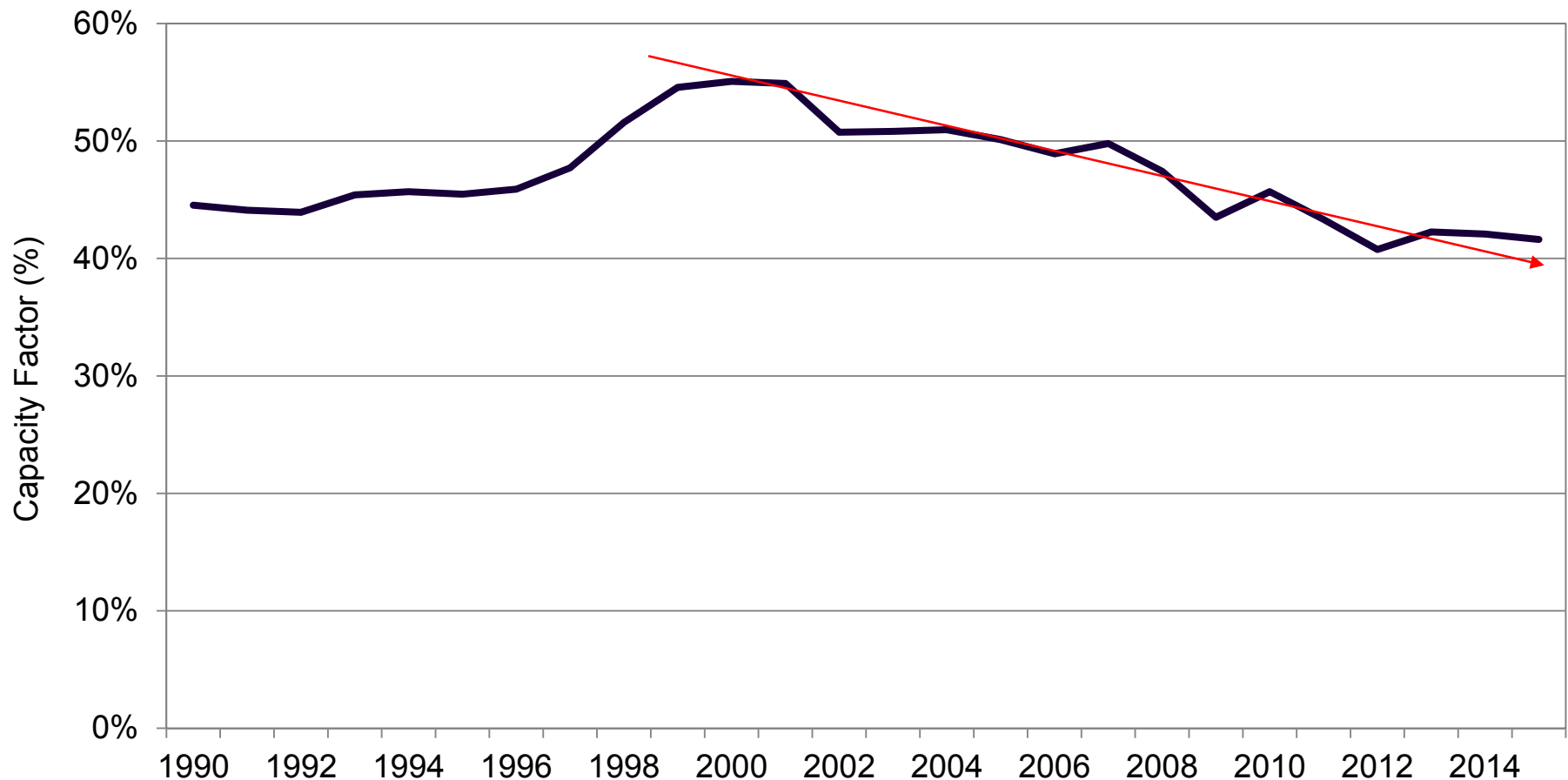
U.S. electric prices – coefficient of variation (standardized dispersion)

The variability of retail electricity prices has grown considerable over the past two decades and is now higher than during the restructuring period.



U.S. electric utility capacity factor

Utilization of generation plant is falling, not increasing, and has been dramatically decreasing since 2006.



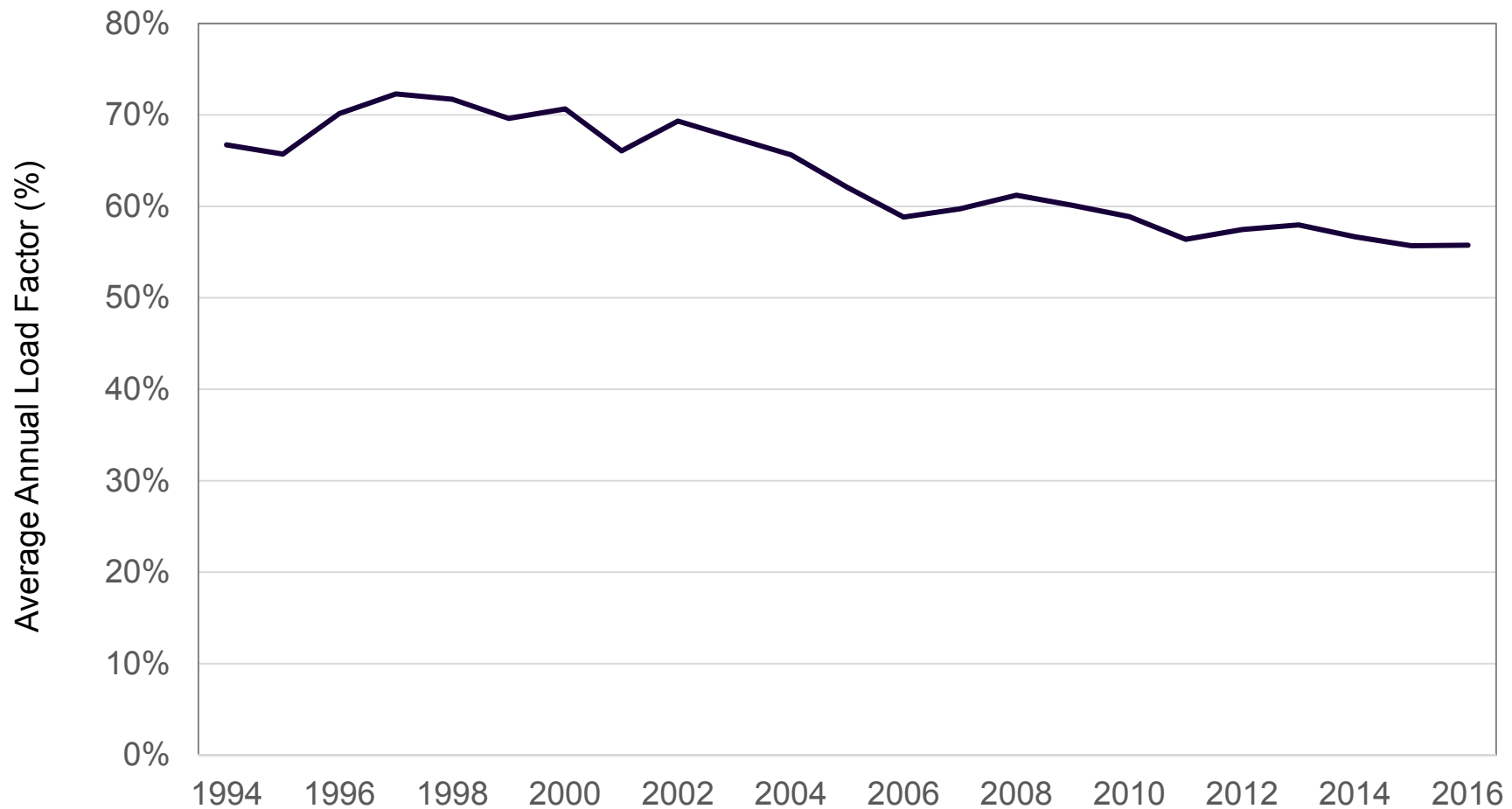
U.S. electric utility production index

Overall utility industry assets (all sectors) have seen significantly lower utilization rates over the past two decades.



Average annual load factor, top utilities (weighted average)

Load factors are becoming less efficient; system becoming more “peaky.”



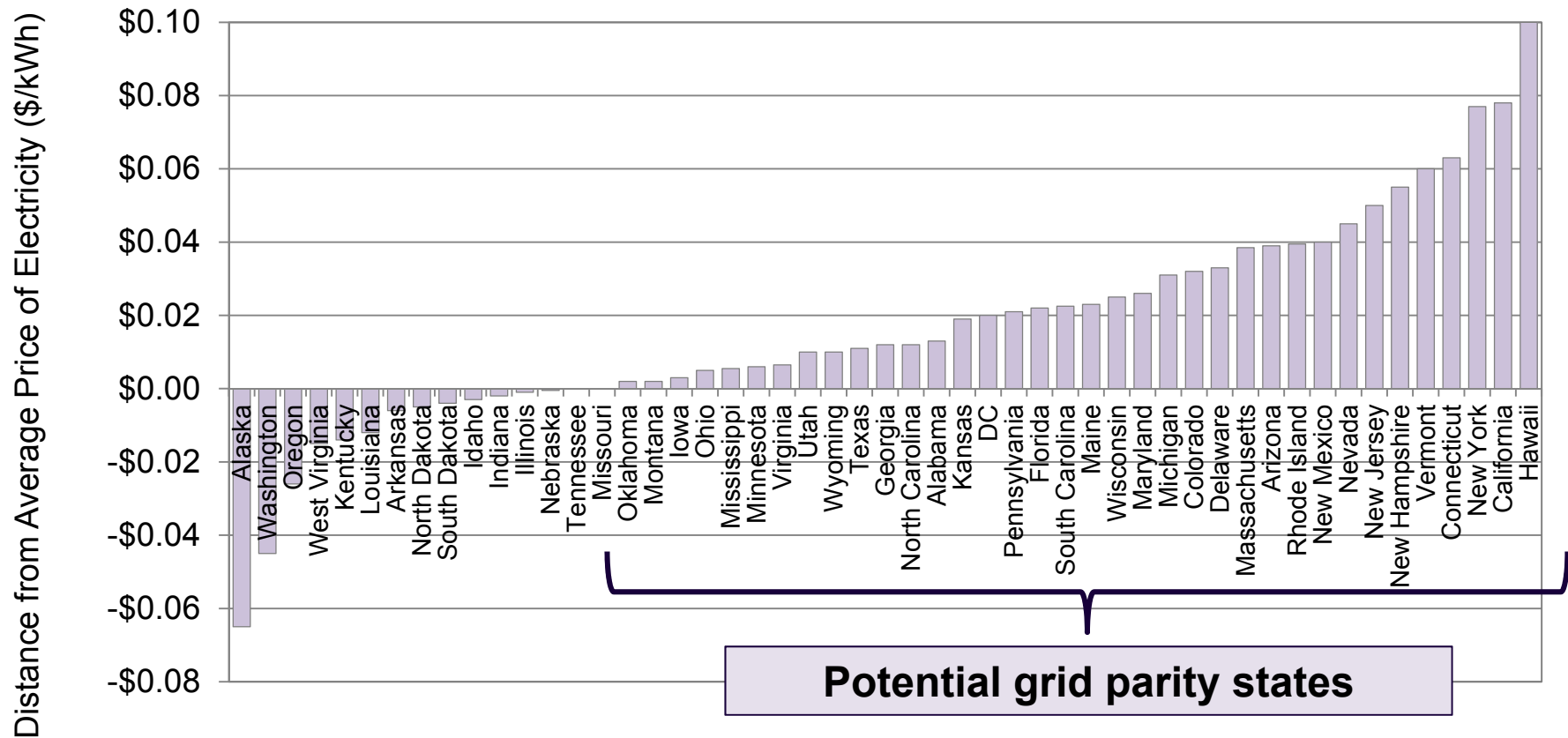
Conclusions

Take-aways

- Regulation has, and **will continue to change** in ways that significantly deviate from traditional theories, practices, and emphases.
- Regulatory emphasis has shifted away from cost/rate minimization and towards **maximizing utility development of social capital**.
- This will make **regulatory policy and governance** entirely more **subjective** and **undermine (if not entirely eliminate) traditional regulatory tools** for imposing utility discipline (i.e., regulatory lag, prudence).
- Result has been, and will continue to be, a **dramatic variation in rates across the country** that will reflect regulatory activism in supporting social capital investments.
- The **profit maximizing outcome for utilities** will be to support, if not expand upon these social investment initiatives **provided their associated risk is removed**.

Solar grid parity estimates

A recent Bloomberg study shows 36 states are expected to reach parity in the near future. Is this a function of lower solar costs or higher utility costs/rates?



Note: Author's construct from source. The purple bars show the anticipated cost of solar energy (assuming a conservative 20-year lifespan for the panels) minus average electricity prices. Positive numbers indicate the savings for every kilowatt hour of electricity.

Source: Bloomberg: <http://www.bloomberg.com/news/articles/2014-10-29/while-you-were-getting-worked-up-over-oil-prices-this-just-happened-to-solar>

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Questions, Comments and Discussion



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