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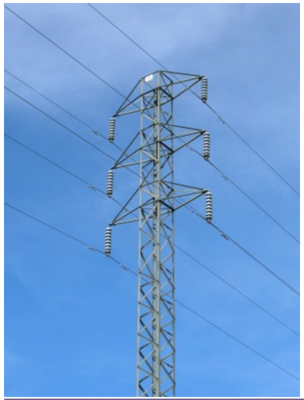

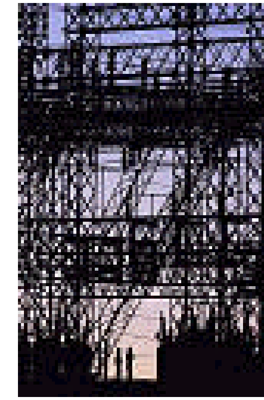

The future of policy and regulation.

Unlocking the Treasures of Utility Regulation, Annual Meeting, National Conference of Regulatory Attorneys, Tampa, Florida

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June 20, 2016

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, prudency).
- 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**.

Traditional Regulation: Theory and Practice

The purpose of utility regulation

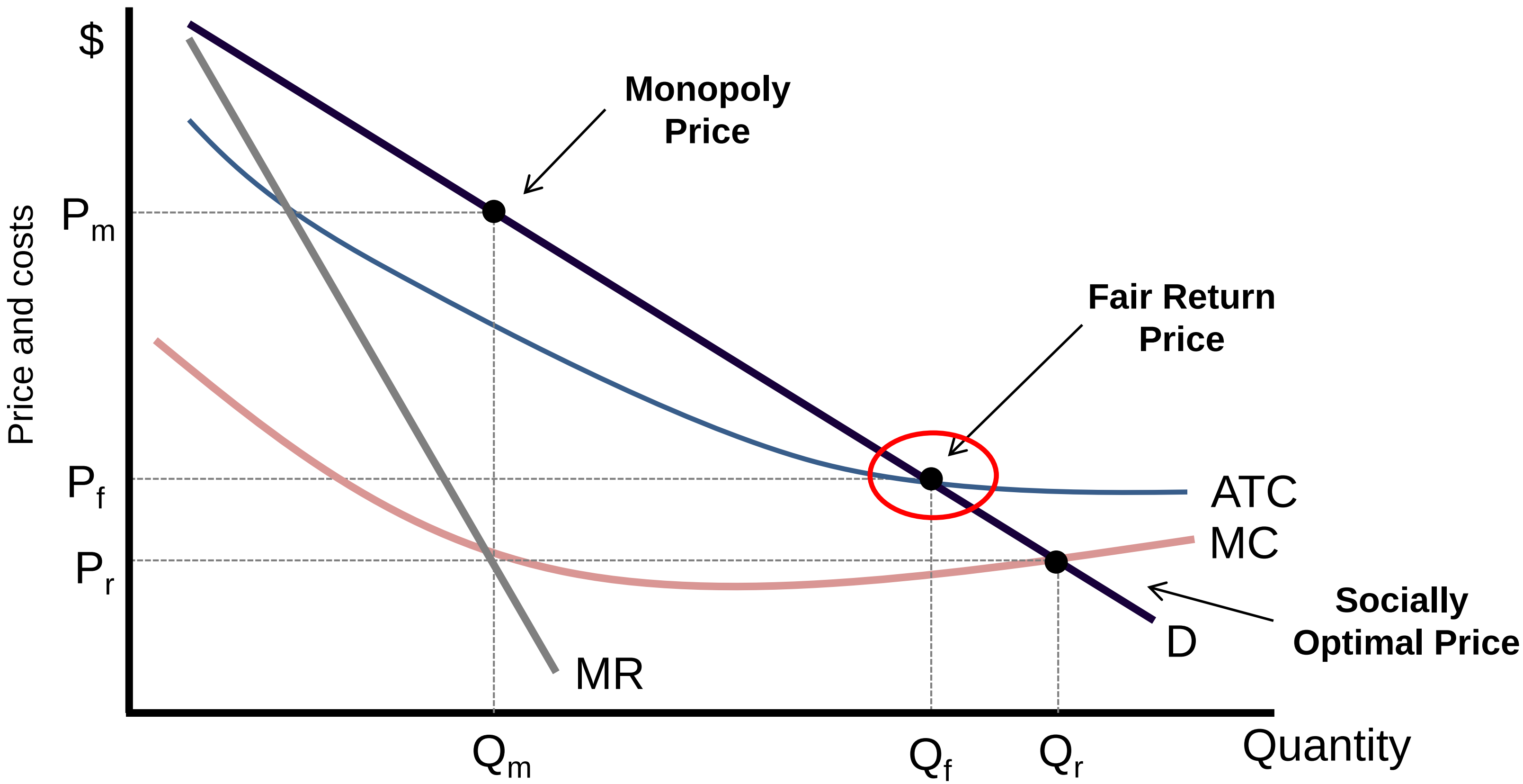
In theory, utilities are regulated for (at least) two reasons:

1. Utilities are **imbued with the public interest**: utilities provide critical services (electricity, natural gas) that are essential for a modern economy; and

2. Utilities are "**natural monopolies**." Utilities have (natural) cost characteristics that allow them to drive competitors out of the market and then price their services at rates higher than competitive markets.

Comparison of pricing outcomes and regulation

Regulators have to choose prices that reflect some middle ground that give utilities a “fair-return” for their investments. This results in prices lower than what would occur under an unregulated monopoly, but higher than those arising in competitive markets.



Regulatory actor incentives

Cloud of Asymmetrical Information

Utilities

Incentives: to maximize profits subject to regulatory constraints.

Regulators

Incentives: to maximize the public interest by reducing unnecessary rate increases.

Ratepayers

Incentives: to maximize benefits subject to budget constraints.

Utility incentives

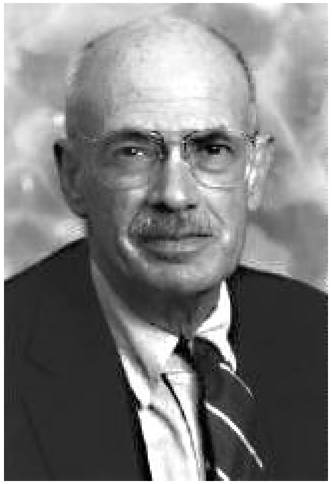
- About mid-century, the theory of regulation started to ask questions about the **traditional profit-seeking incentive** for utilities.

- **Question:** what incentive does a utility have to operate efficiently, and maximize its overall profits since, if a utility operates efficiently, and reduces its costs, **it will increase its profits above its allowed level, thereby stimulating a rate case that will lower its rates and returns.**

- **If regulators repeatedly expropriate profits, there is little incentive to be efficient nor innovate** (?).

- In fact, the only way to increase rates is through an increase in reported costs.

What is the Averch-Johnson effect?



Harvey Averch and Leland Johnson and published in the *American Economic Review* in **1962**, posited that rate of return regulation creates **an incentive for regulated utilities to overcapitalize**, resulting in an **inefficient utilization of resources** and higher than optimal rates.

This finding, however, was **premised upon a model with a number of assumptions**, one of which presumed there was <u>**no regulatory lag**</u> and that <u>**rates were set on a period-to-period basis**</u>: in other words, rates were set on a "cost-plus" regulatory approach.

Source: H. Averch and L. Johnson. (1962) "Behavior of the Firm under Regulatory Constraint." *American Economic Review*. 52:1052-1069.

Follow-Up A-J research

Soon after its publication, Averch's and Johnson's article was met with a **flurry of scholarly research** attempting to **empirically verify** the A-J effect, as well as examining the conditions under which the effect would, and would not, be sustained.

Rejoinders to the research noted that two characteristics of the regulatory process tended to temper the likelihood and prevalence of the **A-J effect and other inefficiency incentives**:

1. the possibility of **disallowances** through the prudence review process and
2. the **positive efficiency incentives created by regulatory lag**. In fact, a series of articles published soon afterwards noted that regulatory lag typically creates incentives for utilities to seek efficiency opportunities between rate cases since the gains (profits) from those investments inure to shareholders instead of ratepayers.

Regulatory lag as a form of market discipline

Regulatory lag is often defined as the period of time between when a utility's rates go into effect and its next rate case and is an important means by which **traditional regulation** is thought to **inject discipline upon utilities similar to that arising in competitive markets**.

Under traditional regulation, **rates are set on a utility's prudently-incurred costs**:

- If a **utility improves its operating/investment efficiencies** after a rate case, then **the increased profits** associated with these actions accrue to the utility much like they would in a **competitive market.**
- The **inverse occurs if a utility becomes less efficient** or is unable to contain its costs after a rate case: profits will fall much like they would in a competitive market.

Social Capital

Market failures

Today's social investment policies are intended to address **a variety of perceived energy market failures**:

Natural monopolies/market power: when you have few firms and/or one firm controls/dominates the market.

Externalities: when one party's actions impose an unaccounted for cost (or benefit) onto another party.

Asymmetric information: when one party has more information than another and uses that information for strategic gain.

Risk & Uncertainty: arises in markets influenced by a variety of random factors that can be partially known (can be assigned probabilities) or entirely unknown (cannot be assigned probabilities).

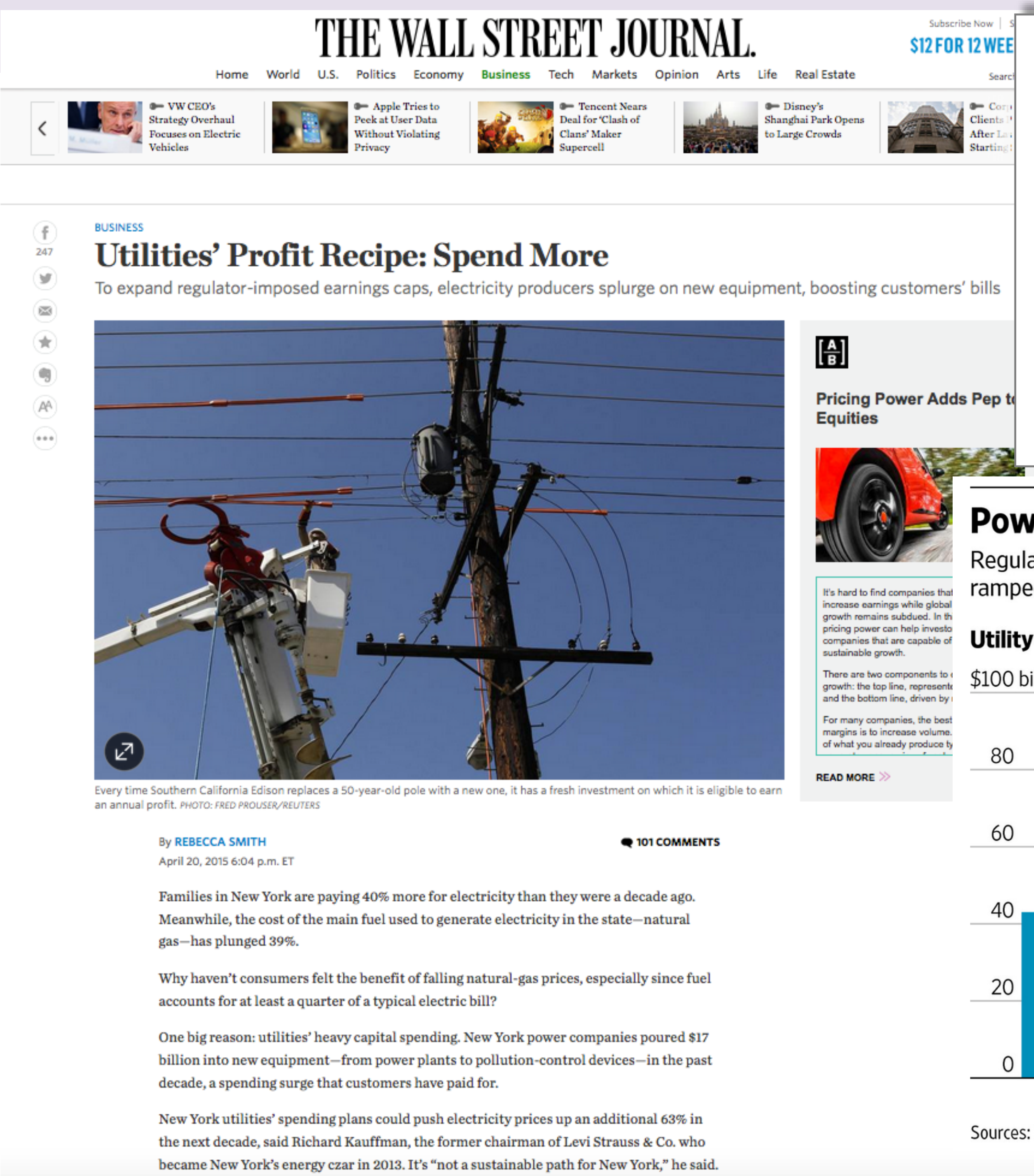
Efficiency and current policy agendas

What social investments are attempting to address which 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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BUSINESS

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?

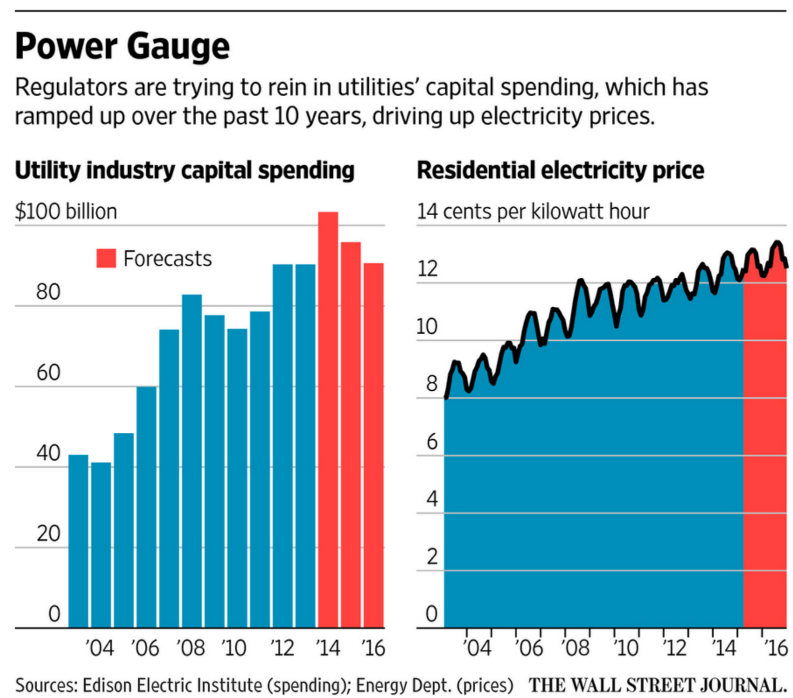
One big reason: utilities' heavy capital spending. New York power companies poured $17 billion into new equipment—from power plants to pollution-control devices—in the past decade, a spending surge that customers have paid for.

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

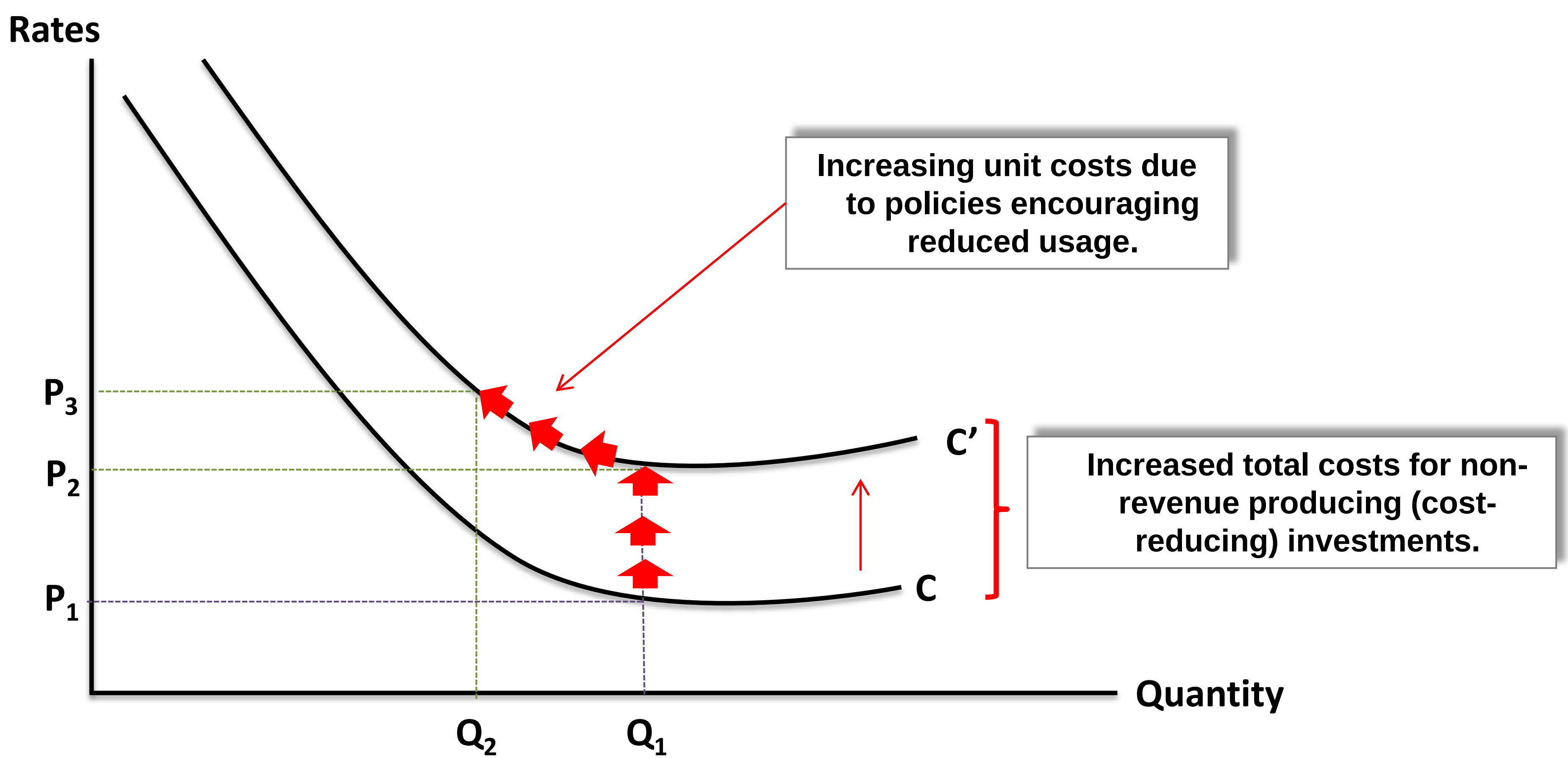
READ MORE

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



Current policy agendas: conceptual impacts

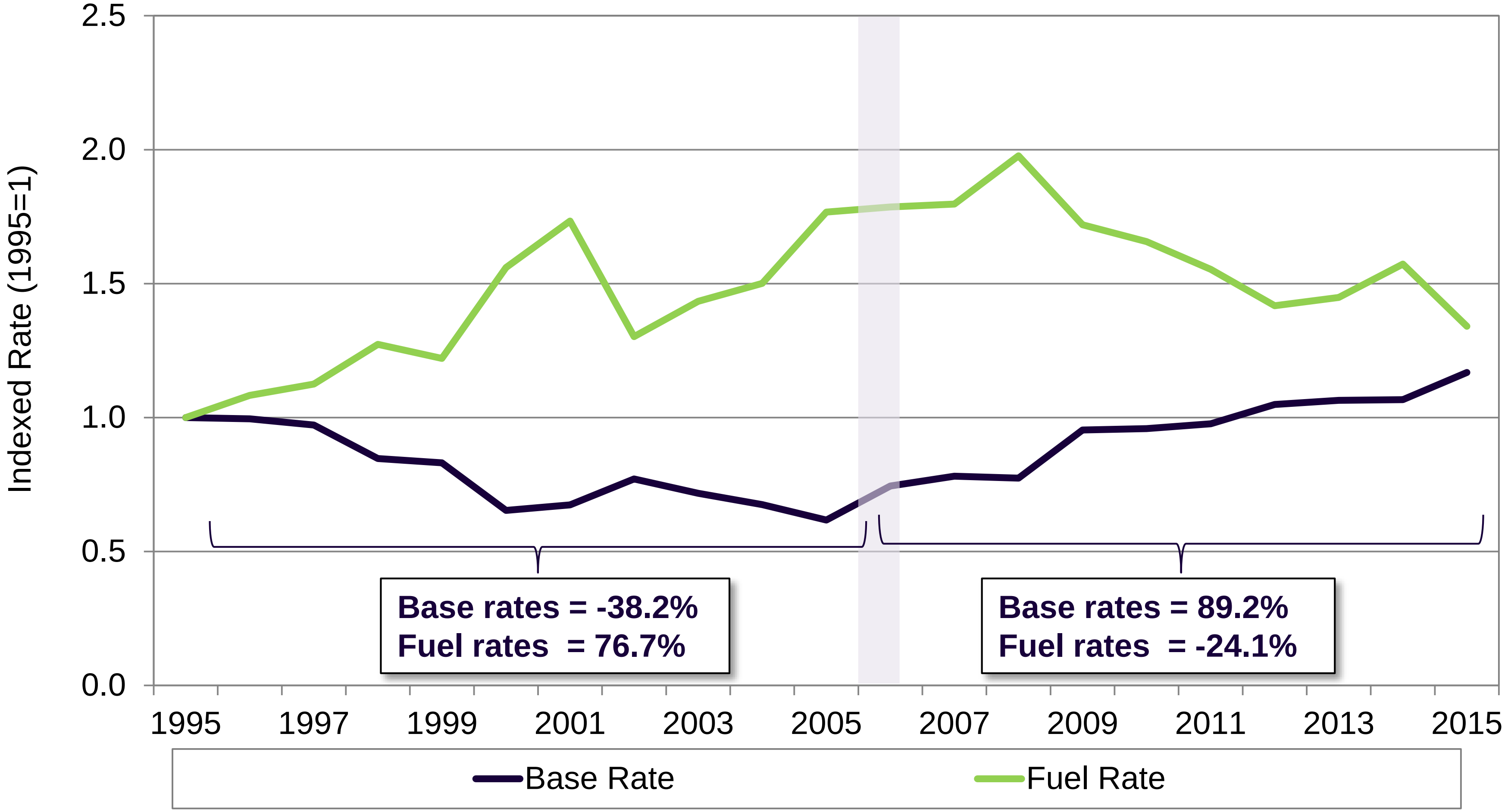
Current policy agendas are increasing rates through (a) a significant increase in non-growth related capital investment and (b) a reduction in system utilization through demand reductions and intermittent resources.



Rate Implications & Impacts

Annual percent change in base rate versus fuel rate – electric

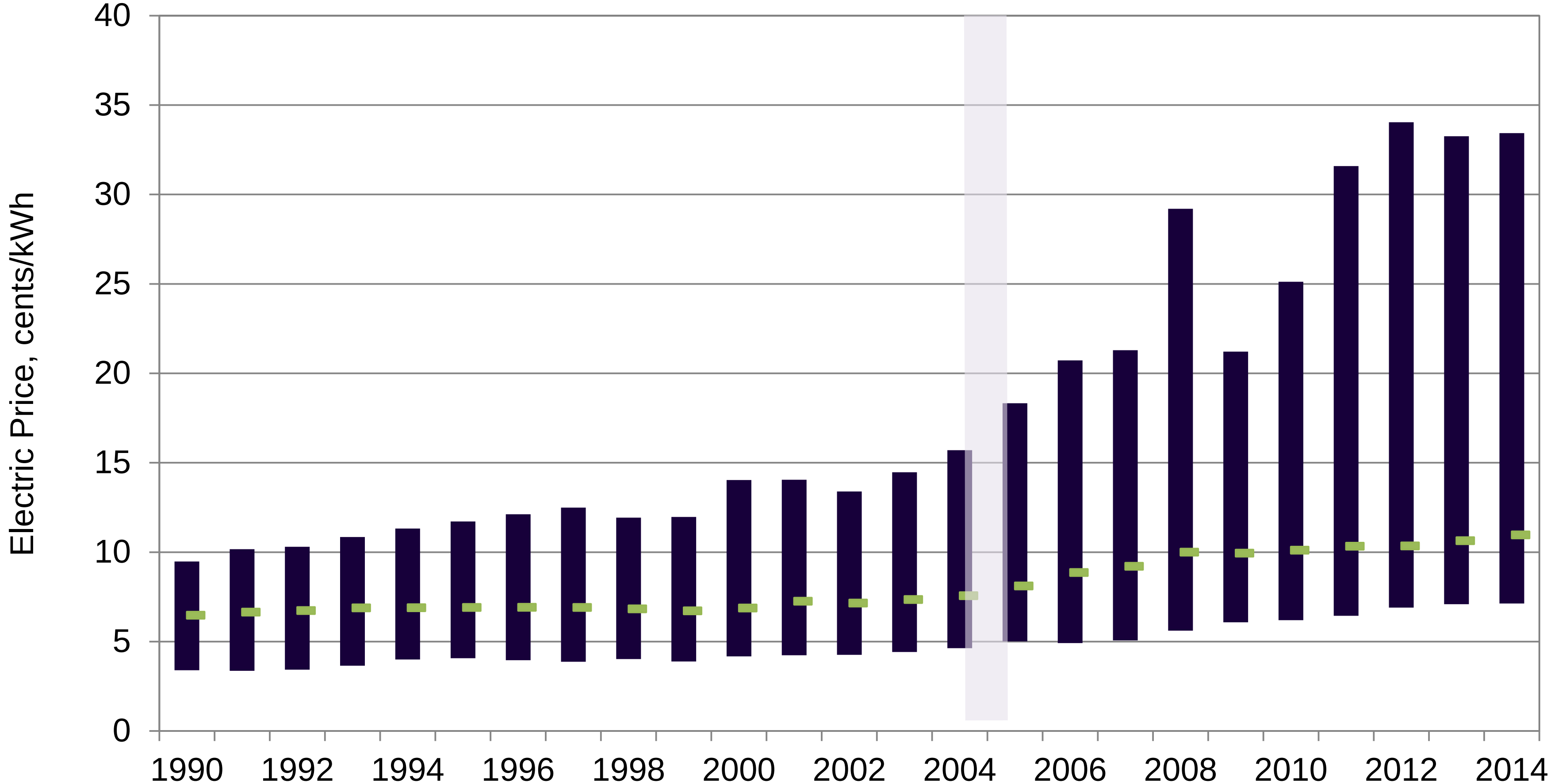
Base rates (electric) have increased almost 90 percent since 2005, compared to fuel rates that have decreased by 24 percent.



Source: Energy Information Administration, U.S. Department of Energy; and Federal Energy Regulatory Commission.

U.S. electric prices – range of prices

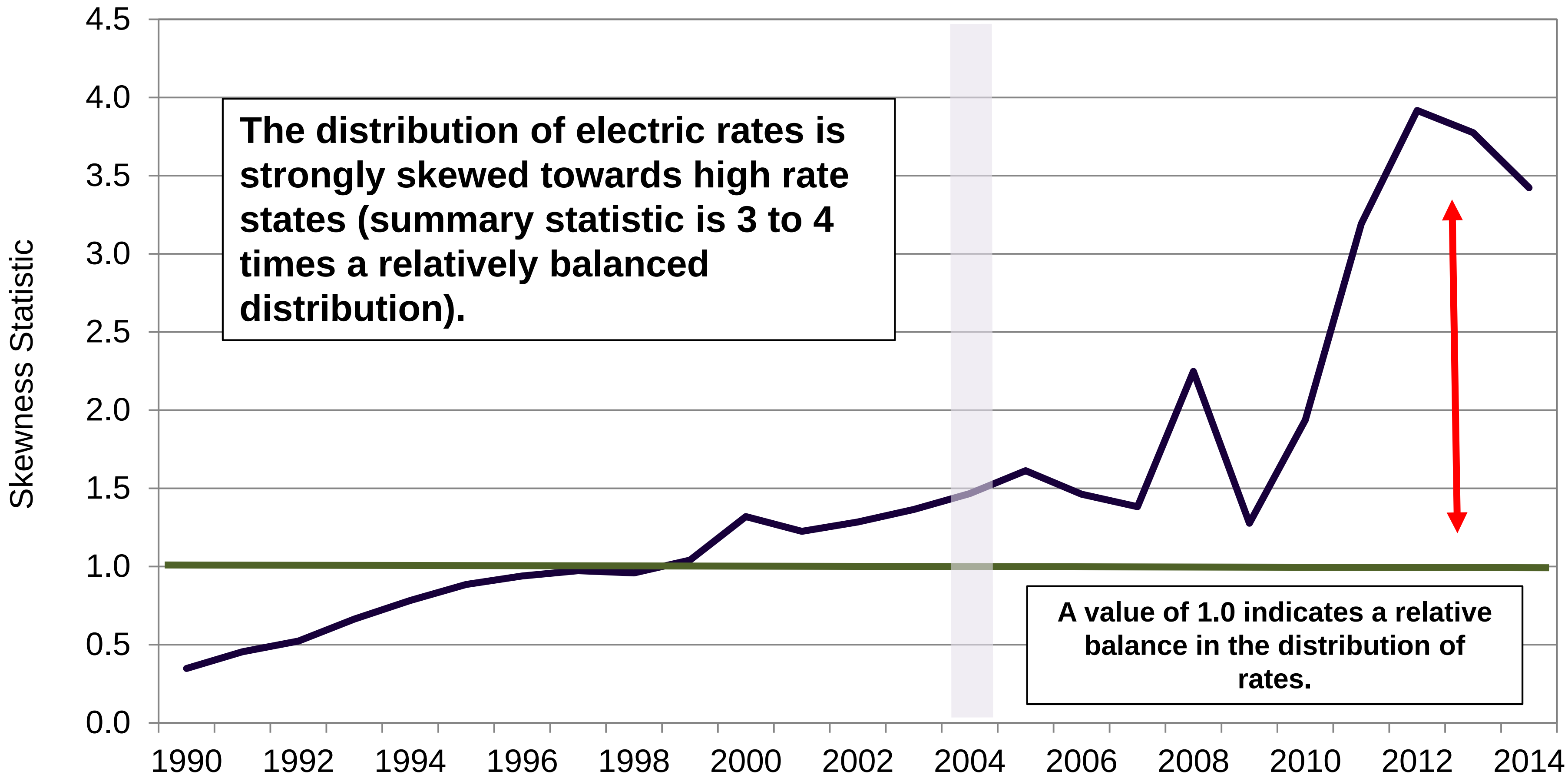
Simple "high-low" chart further illustrates the growing dispersion in retail electricity prices.



Source: Energy Information Administration, U.S. Department of Energy.

U.S. electric prices – skewness

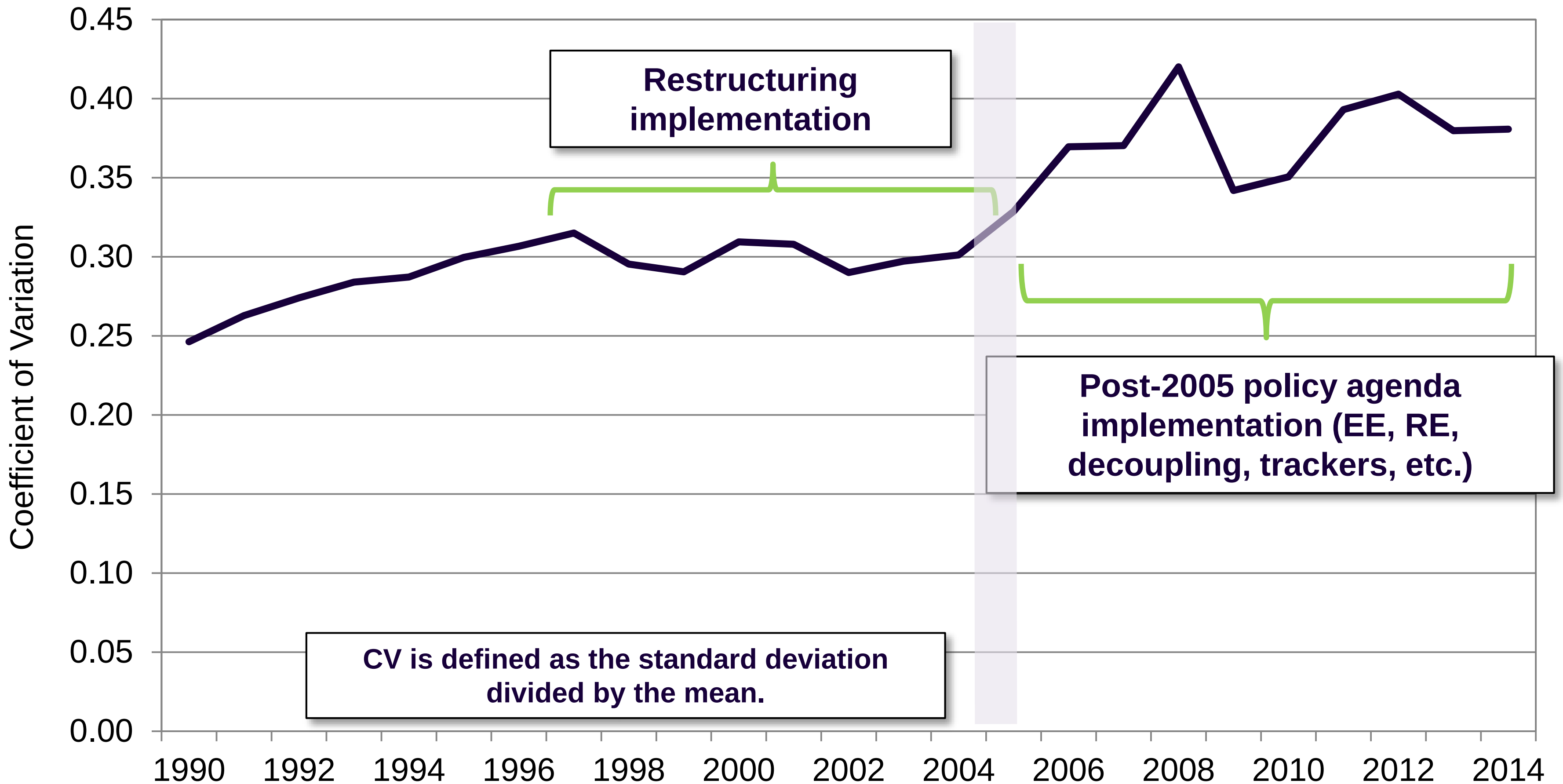
The skewness in the distribution of utility rates is increasing rapidly indicating that states with higher rates are dominating the distribution.



Source: Energy Information Administration, U.S. Department of Energy.

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

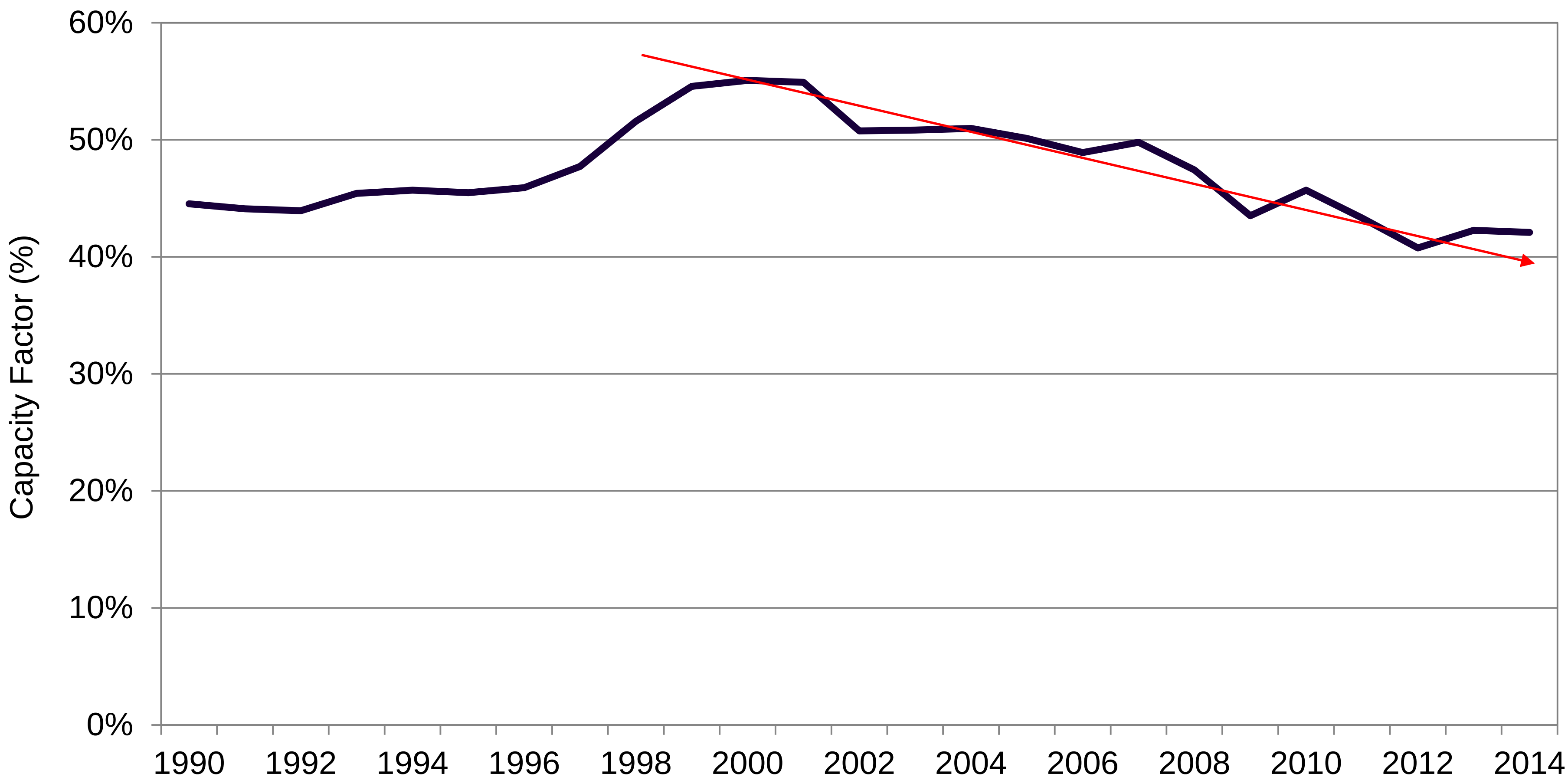
The variability of retail electricity prices has grown considerable over the past two decades and is now higher than during the restructuring period.



Source: Energy Information Administration, U.S. Department of Energy.

U.S. electric utility capacity factor

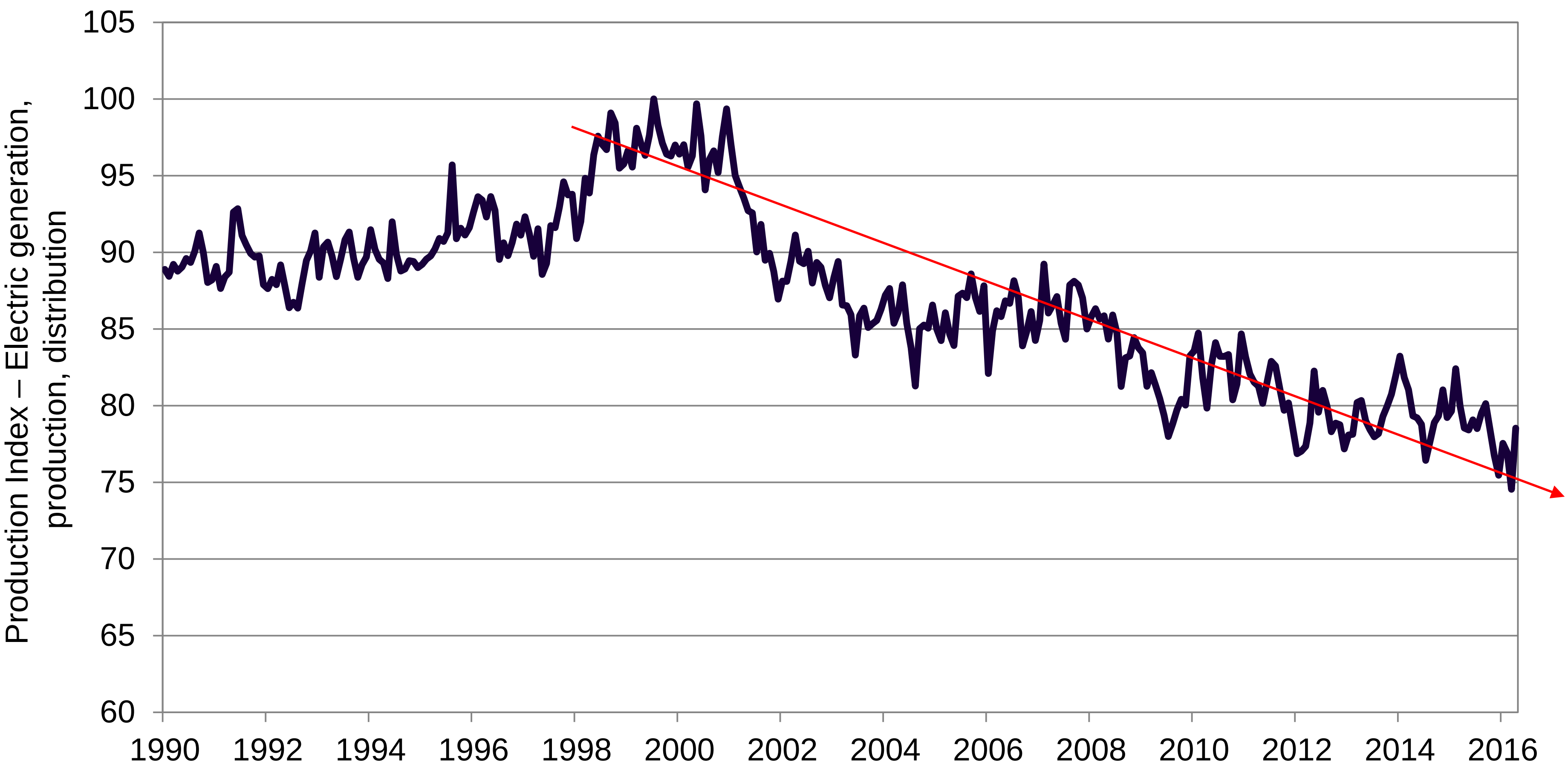
Utilization of generation plant is falling, not increasing, and has been dramatically decreasing since 2006.



Source: Energy Information Administration, U.S. Department of Energy.

U.S. electric utility production index

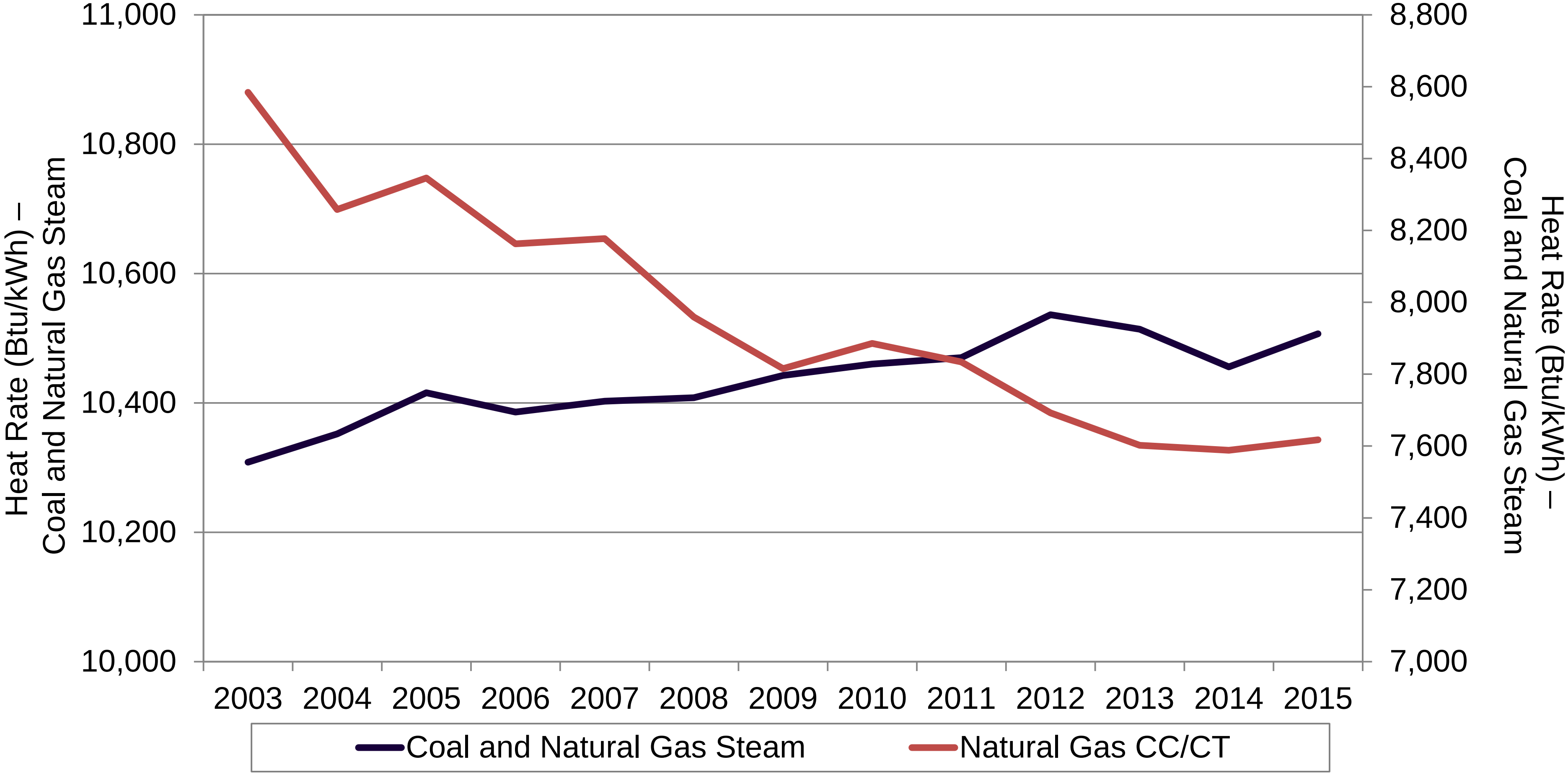
Overall utility industry assets (all sectors) have seen significantly lower utilization rates over the past two decades.



Source: Federal Reserve Bank.

U.S. electric utility generation – average annual fossil-fuel heat rate

While combined cycle efficiencies have been improving, steam generation utilization has become increasingly less efficient.



Source: Energy Information Administration, U.S. Department of Energy.

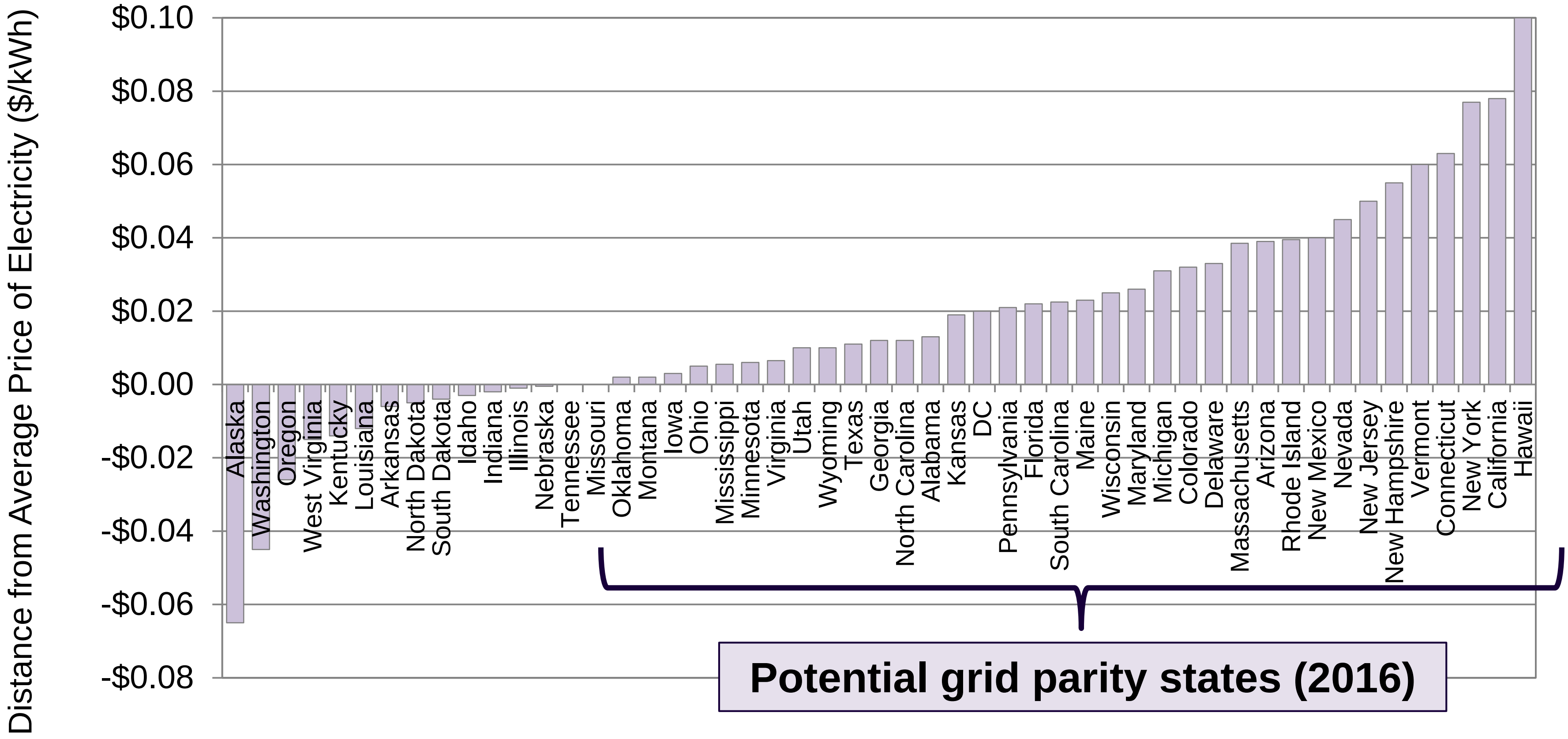
Conclusions

Conclusions

- Emerging regulatory model is sustainable only to the extent that the regulatory-determined supply of social capital is equal to the demand for that social capital. In other words, ratepayers' willingness to pay for the **<u>aggregate</u>** levels of social capital determined by regulators.
- **The probability that regulators will accurately choose the optimal level of social capital investment is likely low**. The history of regulation (and public policy) is not filled with a large number of success stories on administratively-determined investment outcomes.
- The process will likely price out of the market some ratepayers that have a **low, or very selective, valuation of social capital** or, in the alternative, can meet their demand for social capital in alternative or more effective ways.
- The ratepayers choosing alternative solutions are likely **larger-than-average users,** and **reductions in their contributions** to the cost of maintaining this system of social capital **will have to be recovered from other ratepayers**, further exacerbating this problem, at the margin, leading to a number of outcomes that will highly **challenge traditional measures of system efficiency and utilization**.

Solar grid parity estimates

A recent Bloomberg study shows 36 states are expected to reach parity by 2016. 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

Questions, Comments and Discussion

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