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# Infrastructure and Rate Structure: Lessening the Shock

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# Challenges Facing Utilities and Ratepayers

The utility industry's infrastructure and environmental compliance investment needs are enormous.

**Forecast of Electricity Utility Investments**

| | Base Case: No Carbon Policy | Upper Case: with Carbon Policy |
|---|---|---|
| **Capital Investment in $ Billions (2010 - 2030)** | | |
| Generation | 505 | 951 |
| Transmission | 298 | 298 |
| AMI and EE/DR* | 85 | 192 |
| Distribution | 582 | 582 |
| Total | 1,470 | 2,023 |

* Advanced Metering Infrastructure, Energy Efficiency / Demand Response Programs

Source: Brattle Report "Transforming America's Power Industry: The Investment Challenge 2010-2030," Table 1.

# Slow Growth in Electricity Demand

At the same time, electricity demand (and utility revenues) is expected to grow slowly:

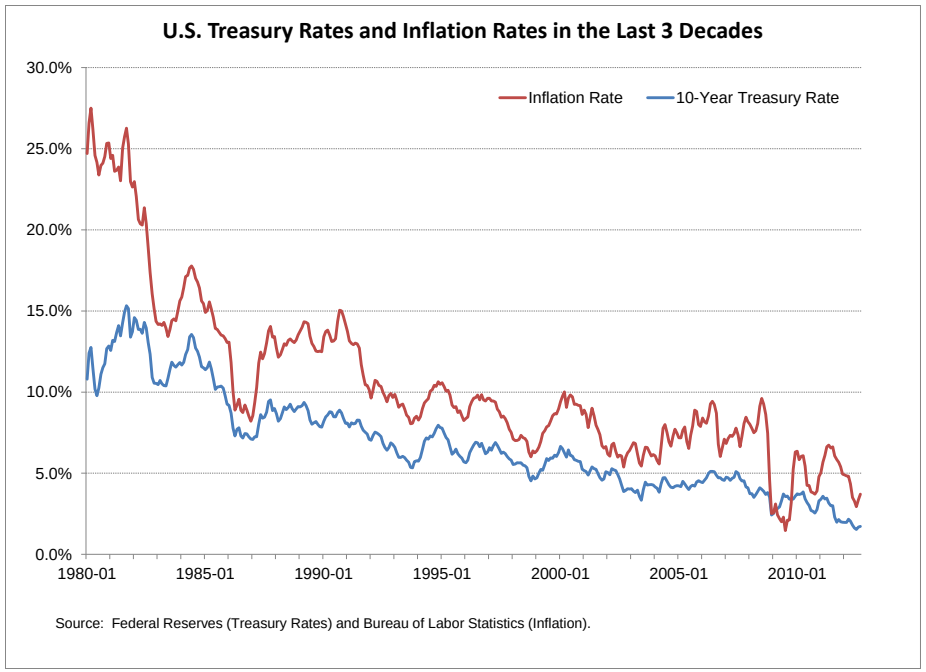
"U.S. Electricity Use Is Expected To Grow Slowly

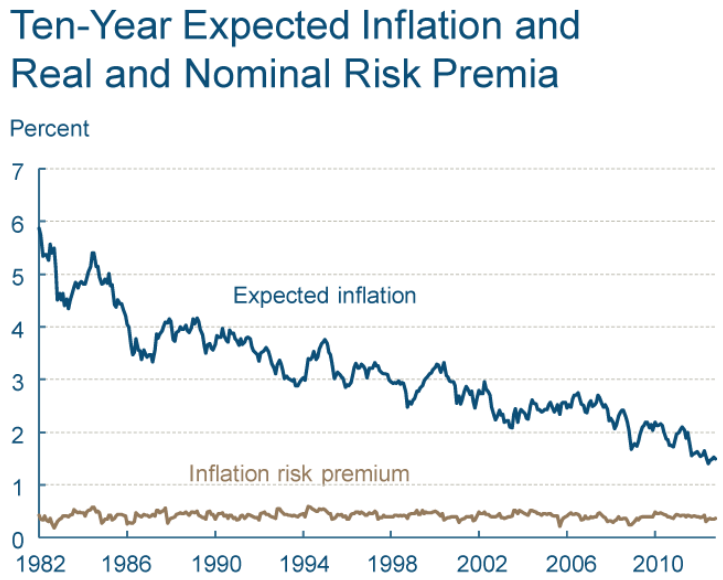
… electricity demand growth has slowed progressively by decade since 1950, from 9% per year in the 1950s to less than 2.5% per year in the 1990s. Electricity demand grows by 0.8% per year through 2035." (EIA)

The combination of investment requirements and slowed growth in electric demand can potentially lead to rate shocks.

# A Unique Moment?

Interest rates are at historic lows as is inflation in short-run.



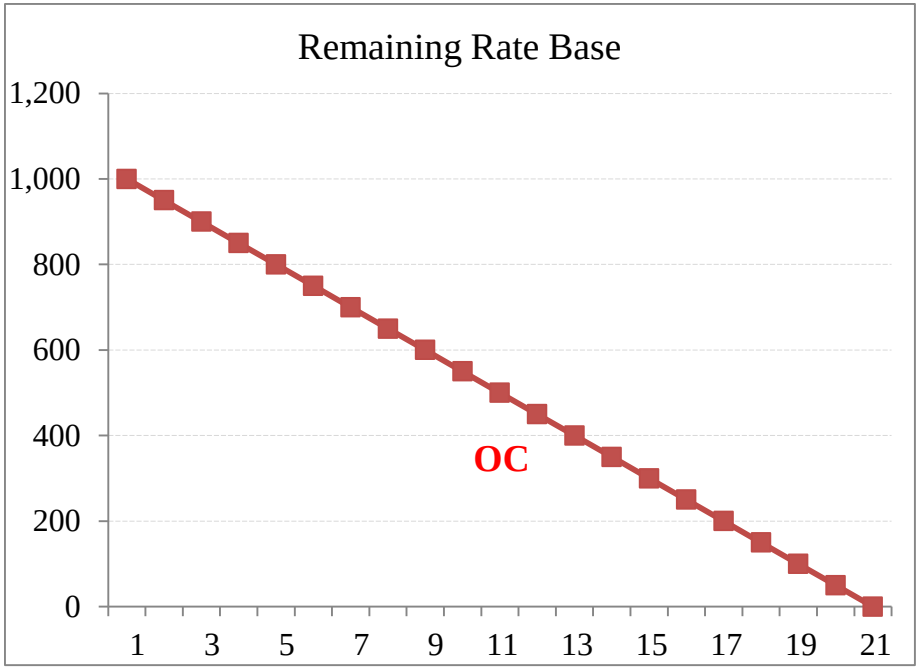

Source: Federal Reserve Bank of Cleveland, "Estimates of Inflation Expectations."

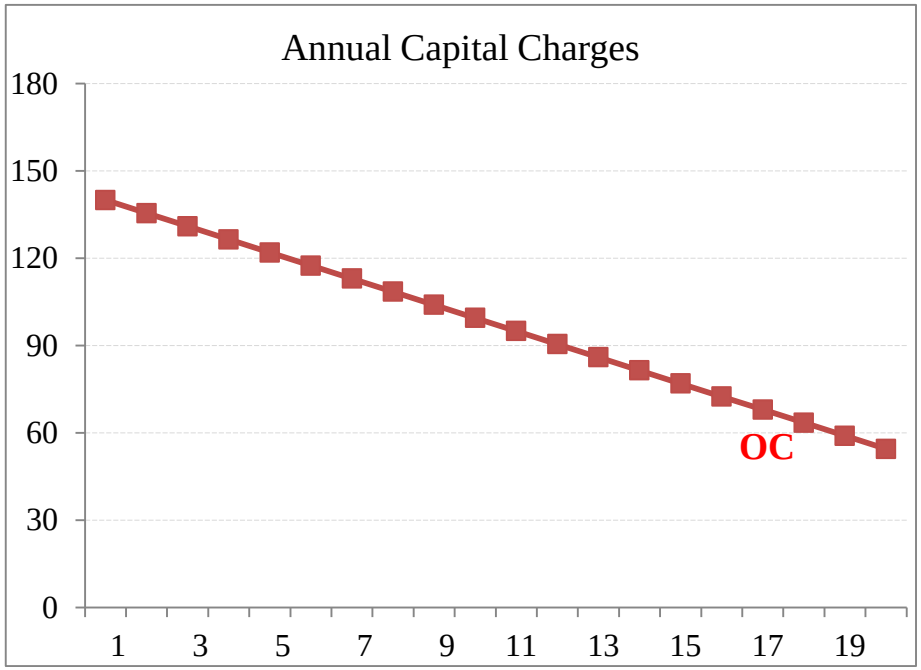
These conditions make investing now very attractive.

# Traditional Ratemaking Contributes to Rate Shocks

Standard ratemaking based on depreciated original cost (OC) leads to front-end loaded rates.

**Rate Base and Capital Charges under Standard Ratemaking**
($1,000 Asset, 20-Year Straight-line Depreciation, 9% Nominal Cost of Capital)



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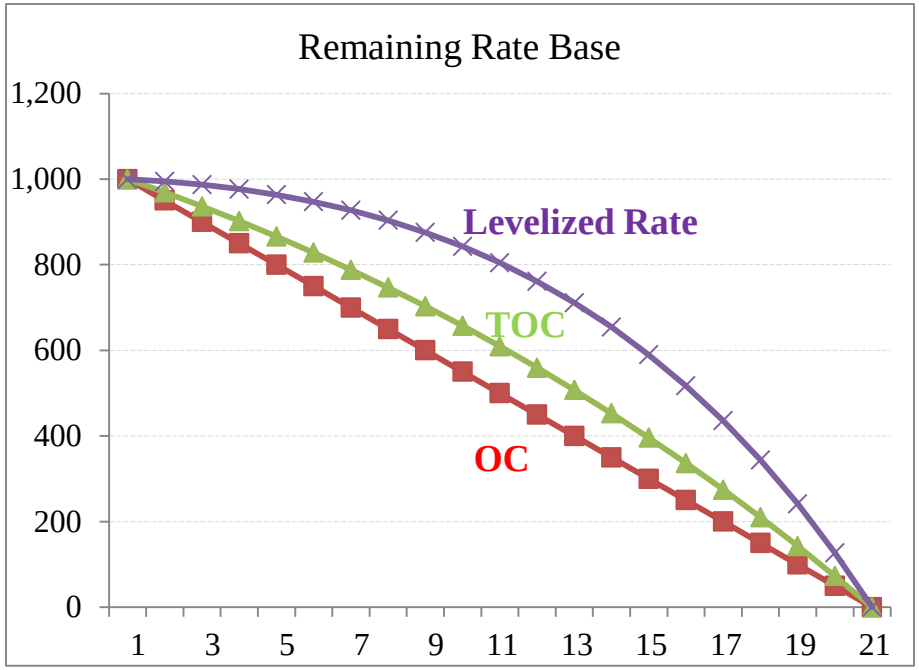
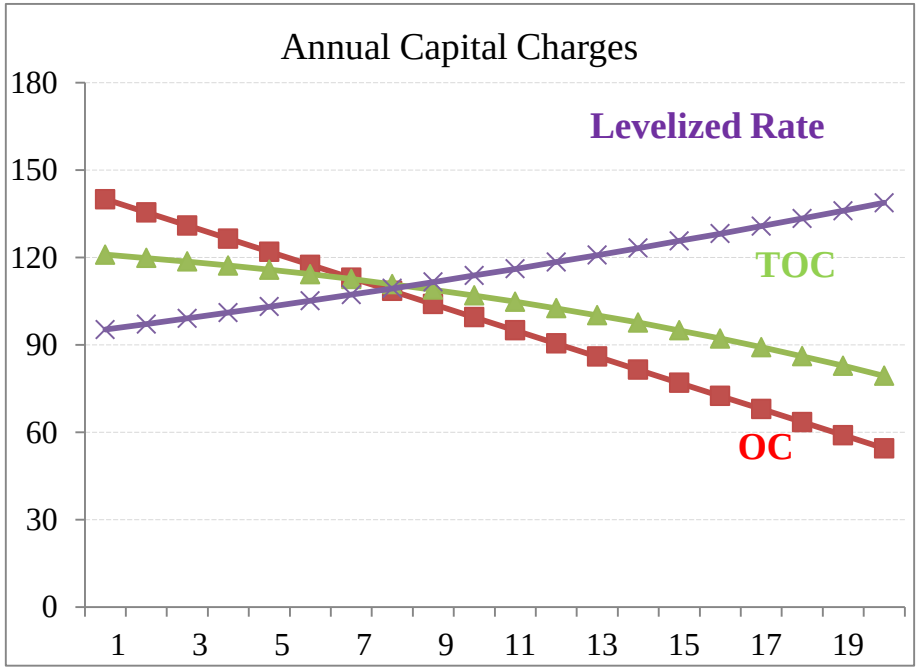
# Alternative Ratemaking Can Reduce This Problem

**Rate Base and Capital Charge under Alternative Ratemaking Methodologies**
($1,000 Asset, 20-Year Straight-line Depreciation, 9% Nominal and 7% Real Cost of Capital)



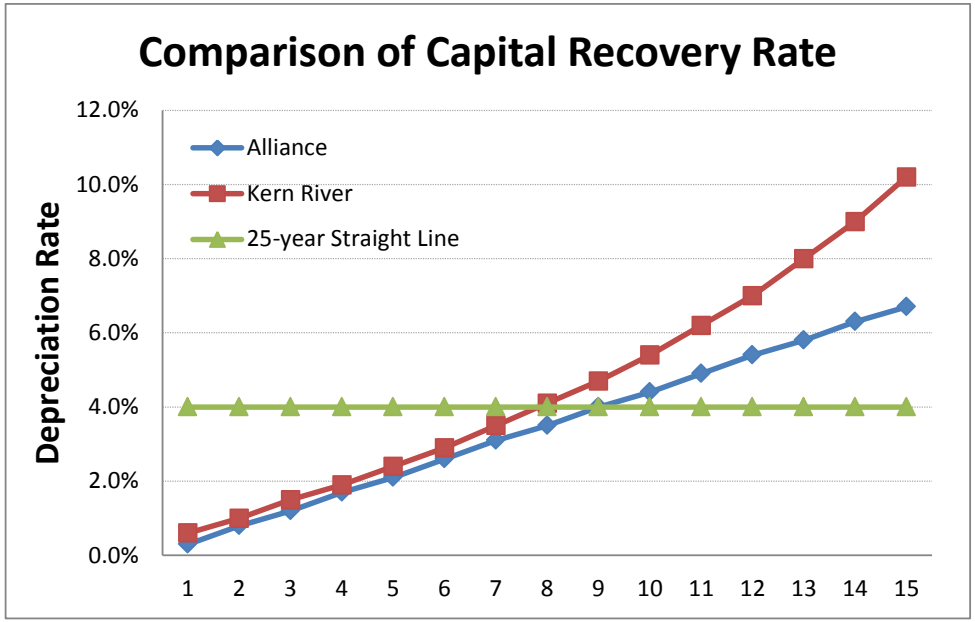

- Trended original cost (TOC): delays inflationary portion of the rate of return;
- Level real rate (shown above): level total recovery in real terms (but rising in nominal);
- Level nominal rate (not shown): level total recovery in nominal terms.

In addition, these rates are more consistent with prices in competitive markets.

# Levelized Rates Widely Used Outside Electric Utilities

TOC or levelized (real or nominal) rates have been adopted in FERC-regulated industries:

- TOC first adopted by FERC in the 1980s for oil pipelines, but just for equity;
- Increasingly used in gas pipelines and electric transmission;
- Many technical/implementation details have been resolved in FERC proceedings.

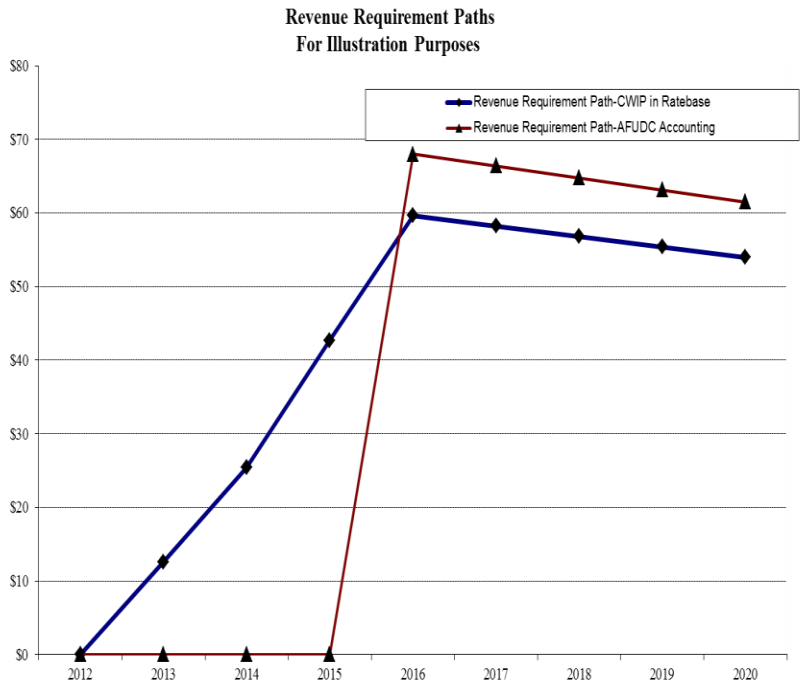



Levelized rates are also widely used in independent power purchase contracts and renewable contracts.

# Impact of Levelized Rates v. Other Mechanisms

Allowing construction work in progress (CWIP) in the rate base offers short-term funding relief over the construction period, but could still lead to rate shocks:

- CWIP in rate base: the return on investment during construction is directly recovered in current rates rather than capitalized and deferred for future recovery;
- Pre-funding of construction costs serves similar purposes.




Levelized rates can be used in combination with CWIP to further spread the capital cost recovery over the life of the asset's service period.

# Investor Risks and Utility Financing Challenges

While alleviating rate shocks, levelized rates and TOC delay capital recovery.

- Investors will want compensation for the increases in risks.
  - Regulatory risk aside, investors require higher rates of return for longer-maturity investments.

- Utilities will view these approaches as raising their financing challenges and regulatory risk.
  - Multiple tranches of debt with different maturities may be required to match the project cash flows.
  - Utilities debt/equity ratio may have to be decreased.

# Remedies for Investor Risks / Financing Challenges

Mechanisms to reduce regulatory risks.

- Establish regulatory processes and procedures to measure capital recovery:
  - Reinvested Earnings Account (akin to regulatory asset accounts in accounting).
- Legislation may be needed that strengthens the commitment to long-term recovery of the capital investment.

Credit rating agencies recognize explicitly the regulatory commitment in evaluating a utility's credit worthiness.

- A positive feedback between regulatory environment and credit ratings may lower the cost of debt and, ultimately, rates.

# Conclusions

Huge investments for utility infrastructure and environmental compliance are needed.

- Financing costs are at record lows.
- Traditional ratemaking front-end loads investment costs, aggravating the problem of rate shock.

Levelized and TOC rates can reduce the rate impacts.

- Widely adopted in other energy industries.
- Increased risk to investors and utilities must be addressed for these approaches to work.

# Additional Readings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Kolbe, A.L., P.Q. Hanser, and B. Zhou, "Infrastructure and Rate Structure: Lessening the Shock," The Brattle Group working paper (forthcoming).

# Speaker Bio and Contact Information

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Mr. Hanser assists clients in issues ranging from utility industry structure and market power and associated regulatory questions, to specific operational and strategic issues, such as transmission pricing, generation planning, and tariff strategies. He also has expertise in fuels procurement, environmental issues, forecasting, marketing and demand-side management, and other complex management and financial matters.

Over his thirty years in the industry, Mr. Hanser has appeared as an expert witness before the Federal Energy Regulatory Commission (FERC), many U.S. and Canadian public utility and siting commissions, before arbitration panels, and in federal and state courts. He served six years on the American Statistical Association's Advisory Committee to the Energy Information Administration (EIA).

Prior to joining *The Brattle Group*, Mr. Hanser held teaching positions at the University of the Pacific, University of California at Davis, and Columbia University, and served as a guest lecturer at the Massachusetts Institute of Technology, Stanford University, and the University of Chicago. He is currently a Senior Associate, Mossavar-Rahmani Center for Business and Government, Harvard Kennedy School. He has also served as the manager of the Demand-Side Management Program at the Electric Power Research Institute (EPRI). He has been published widely in leading industry and economic journals.

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