

Regulatory policy and accounting practice

© Janice A. Beecher, Ph.D.

INSTITUTE OF PUBLIC UTILITIES | MSU

ipu.msu.edu | beecher@msu.edu

*Please do not distribute by electronic or other means
or cite without permission.*

Revised 11/8/2024



MICHIGAN STATE UNIVERSITY

Poll 1: Accounting regulators

- Which of the following is *not* an accounting regulator:
 - A. Securities and Exchange Commission (SEC)
 - B. Internal Revenue Service (IRS)
 - C. Federal Energy Regulatory Commission (FERC)
 - D. Financial/Governmental Accounting Standards Board (FASB/GASB)

Accounting governance: FASB and GASB

- Congress has ultimate authority for accounting governance
 - ▶ The Securities and Exchange Commission (SEC) delegated standards-setting to the Accounting Standards Board (ASB) in 1938 but retains authority
- The Financial Accounting Foundation (FAF)
 - ▶ An independent, private organization established in 1972
 - ▶ Promulgates financial accounting and reporting standards for public and private companies and not-for-profit organizations that follow Generally Accepted Accounting Principles (GAAP) – recognized as authoritative by various organizations
 - ▶ FAF oversees
 - Financial Accounting Standards Board (FASB), est. in 1973 for the private sector
 - Government Accounting Standards Board (GASB), est. in 1984 for the public sector
- FASB and GASB promulgate Generally Accepted Accounting Principles (GAAP) in coordination



ESG reporting and standards

- Purpose of reporting and standards
 - ▶ Communicate the impact of Environmental, Social, and Governance (ESG) factors pertinent to the reporting company
 - ▶ Establish a framework and disclosure standards facilitating communication about financially material, decision-useful ESG information
 - ▶ Numerous organizations provide guidance, scoring, or standards
 - ▶ Can be understood as enhancing risk disclosure
- Standard-setting authority for reporting and standards
 - ▶ In 2022, the Sustainability Accounting Standards Board (2011) transitioned into the International Sustainability Standards Board (ISSB), becoming part of the International Financial Reporting Standards (IRRS) Foundation
 - ▶ In 2023 IFRS issued statements S1 & S2 requiring companies to disclose in financial statements all sustainability-related risks and opportunities
 - ▶ In 2024, the SEC issued the Enhancement and Standardization of Climate-Related Disclosures for Investors rule
- Ongoing issues
 - ▶ Competing incentives and possible conflict with fiduciary obligations
 - ▶ Authority of and consideration by financial and economic regulators
 - ▶ Consistency with risk management, transparency, and regulatory standards
 - ▶ Separation of E, S, and G based on policies and performance issues



Environmental, social, and governance reporting



<https://www.berrydunn.com>

ESG and regulation

- Utilities exemplify ESG issues and raise interesting regulatory issues
 - ▶ Do ESG objectives align with those of shareholders, ratepayers, and regulators?
- Implementation costs
 - ▶ Monitoring and reporting only
 - ▶ Investment and spending decisions
- Reconciliation with prevailing regulatory standards
 - ▶ Prudence
 - ▶ Used and useful
 - ▶ Just and reasonable
 - ▶ Ratepayer benefits
 - ▶ Public interest
- Should ESG standards also yield to regulators?

Poll 2: Accounting standards

- When regulatory accounting conflicts with Generally Accepted Accounting Principles (GAAP)
 - ▶ GAAP prevails
 - ▶ Regulatory accounting prevails
 - ▶ Parties negotiate a settlement
 - ▶ FASB issues an order
 - ▶ Call Danny Kermode

“GAAP must yield”

- “If GAAP conflicts with the accounting and financial reporting needed by the Commission to fulfill its statutory responsibilities, then **GAAP must yield**. ...
 - ▶ GAAP cannot control when it would prevent the Commission from carrying out its duty to provide jurisdictional companies with the opportunity to earn fair return on their investment and to protect ratepayers from excessive charges and discriminatory treatment” (FERC Order No. 552, 62 FERC 61, 299 (March 31,1993).
- Regulatory policy drives accounting, not vice versa
 - ▶ Accounting principles, standards, and practice inform policymaking
 - ▶ Changing accounting rules does not change regulatory policy
 - ▶ GAAP does not constrain or grant permission
- Examples
 - ▶ Depreciation expense for contributed capital
 - ▶ Valuation of physical and natural assets
 - ▶ Ratebase treatment of expenses
 - ▶ Revenue decoupling



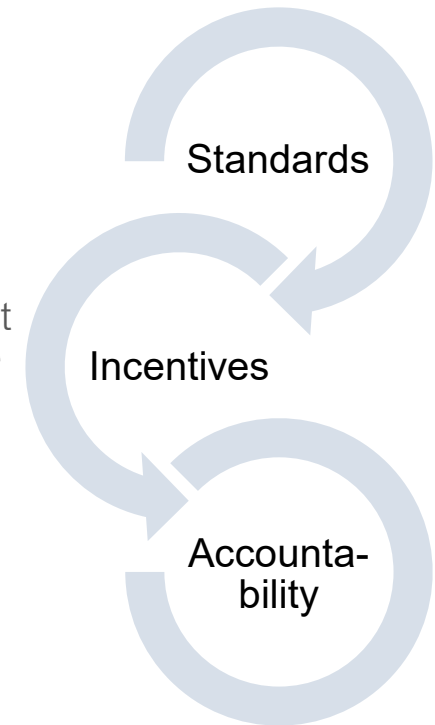
Poll 3: Accounting and policy

- Which of the following is *false*?
 - A. Regulatory policy is expressed in accounting treatment
 - B. Regulatory accountants implement regulatory policy
 - C. Accounting rules constrain regulatory policy
 - D. Accounting treatment plays a role in incentive regulation

“All (economic) regulation is incentive regulation”

- Inspired by Alfred Kahn, popularized by Peter Bradford et al.
- Regulators do not “govern” or “manage” utilities
 - Returns are not “guaranteed”
- Regulation has always been about*
 - Setting performance standards for utilities and markets
 - Providing incentives – exercising discretion
 - Ensuring accountability – enforcing rules
- A formal definition of economic regulation
 - An authoritative institution for governmental intervention in the context of market failure to police, influence, or correct individual or corporate behavior to protect and improve welfare consistent with the public interest and associated social values
- Standards impose structure – baselines and benchmarks
 - Critical for evaluating prudent performance and PBR
 - Sacrifices some flexibility but can promote innovation
 - Set by various regulatory, self-regulatory bodies
 - Examples: NERC (reliability), API (pipeline safety), ISO (fire protection)

* Parallels Morgan & Yeung (2007)



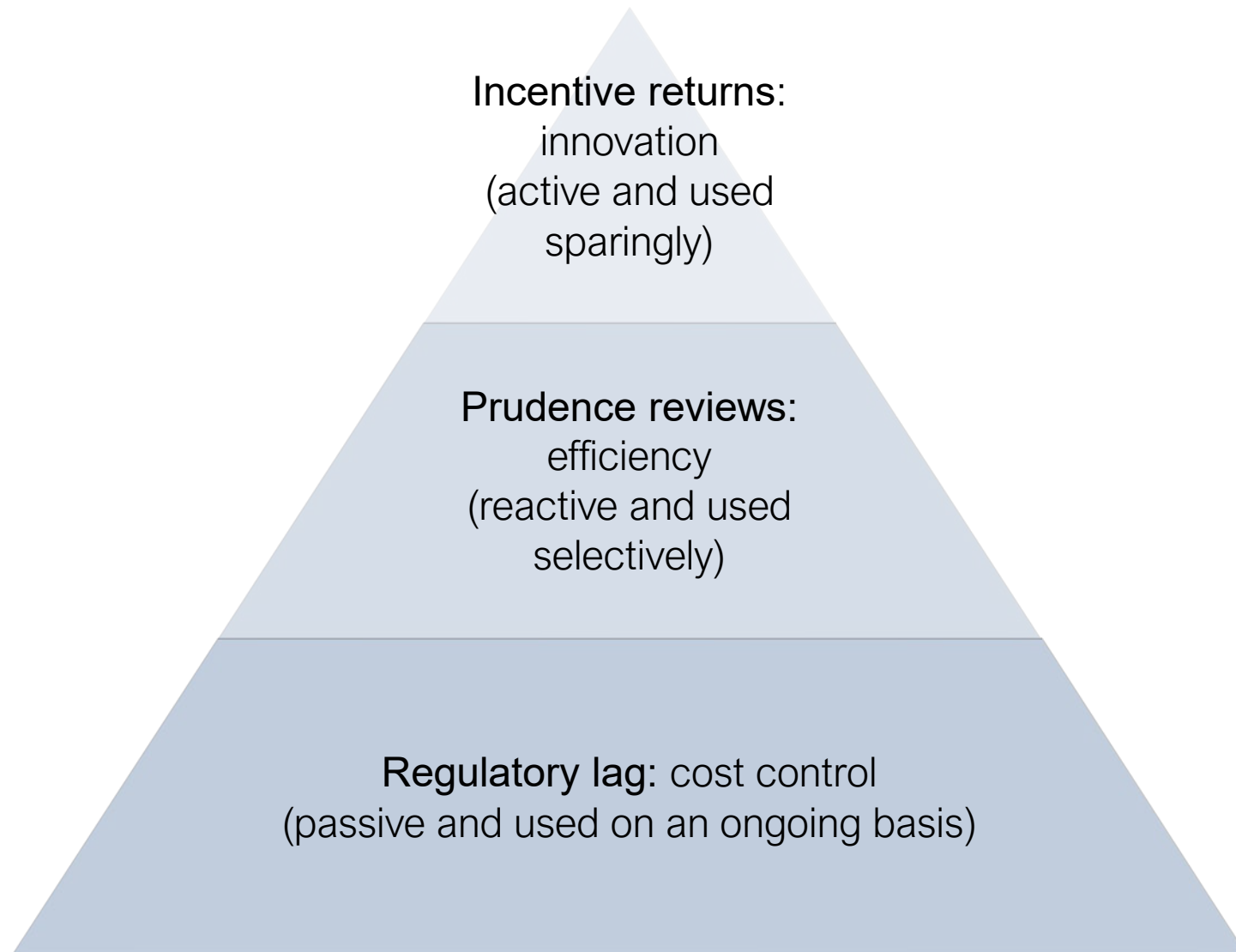
Modifications to regulation and ratemaking

- Possible tensions with
 - ▶ Accounting theory
 - ▶ Finance theory
 - ▶ Economic theory
 - ▶ Legal theory
- Alter or magnify behavioral incentives to achieve policy objectives
 - ▶ Aimed at producers or consumers
 - ▶ Promoted by utilities and other special interests
 - ▶ May reflect regulatory activism
- Involve changes to conventional ratemaking practices
 - ▶ Cost accounting
 - ▶ Cost allocation and rate design
 - ▶ Authorized return on investment

Modifications to regulation and ratemaking

- Tend to shift costs and risks
 - ▶ Among ratepayers
 - ▶ From shareholders to ratepayers
 - ▶ From taxpayers to ratepayers
- Incentive mechanisms also transfer wealth (“subsidization”)
 - ▶ Long-standing critique of economic regulation
 - ▶ Subsidies supported by utility rates are a regressive form of taxation
 - ▶ Direction matters - incentives intended to change the behavior of utilities, their investors, or their ratepayers are distinct from those to advance the goals of universal service

Three risk-based incentive tools used by regulators



Three tools (continued)

- Regulatory lag in cost recovery is part of the regulatory paradigm by design
 - ▶ “Constructive environments” using “best practices” tend to shift risks to ratepayers
 - ▶ Implementing mechanisms to reduce lag call for adjusting authorized returns
 - ▶ Public ownership and deregulation “resolve” the problems of regulatory lag and expense
- Prudential performance is *expected* and earns a fair return only – no bonuses
 - ▶ “[T]he practical purpose of income is to serve as a guide for prudent conduct” (“Hicksian income,” J. Hicks)
 - ▶ “In principle at least, the short run prudence test is no different from the short run efficiency test imposed by competitive markets” (P. Joskow and R. Schmalensee)
 - ▶ Prudence reviews counteract the strong rate base investment incentives under RB/ROR
- Incentive returns can be used strategically but sparingly to motivate innovation
 - ▶ Maintain risk and focus on performance vs. specifying means of achievement
 - ▶ Returns may be narrowed and tied to performance for a specific project
 - ▶ Profit sharing allocates the benefits of innovation between shareholders and ratepayers
 - ▶ Utilities do not enjoy the fruits of efficiency or innovation for very long because regulators “expropriate” or “claw back” the rewards (“ratchet effect” or “recapturing created value”)
 - ▶ *Competition has the same effect* (see E. Bailey, 1974)

Incentives under traditional regulation

		Investment	Performance		
			Cost control	Efficiency	Innovation
Return on investment	Premium embedded in the fair return to promote infrastructure investment	✓			
Financial accounting and reporting	Transparency in capital and operating expenditures and performance		✓		
Cost recovery	Disallowance of imprudent capital or operating expenditures		✓		
Regulatory lag	Time period between cost incurrence and an authorized rate adjustment		✓		
Prudence reviews	Sound managerial decisions based on knowable information			✓	
Financial audits	Detailed review of general or project-specific financial indicators			✓	
Management audits	Detailed review of general or project-specific management practices			✓	✓
Price freezes or caps	Extension of regulatory lag to a multiyear rate period			✓	✓
Certificate of public convenience	Review of planned capital expenditure to ensure its necessity			✓	✓
Integrated resource planning	Balanced consideration of supply-side and demand-side management options			✓	✓
Performance standards	Specified terms of service to ensure acceptable performance			✓	✓
Incentive returns	Bonus above fair return tied to performance to promote innovation				✓

Poll 4: Regulatory lag

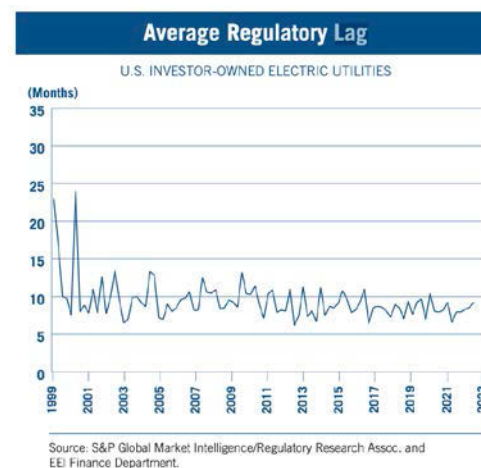
- Can regulatory lag be a good thing?
 - A. Always
 - B. Never
 - C. Sometimes
 - D. Not sure

Role of regulatory lag

- Allred Kahn (1971) on regulatory lag
 - ▶ Lag should be “regarded as not a deplorable imperfection of regulation but as a positive advantage. Freezing rates for the period of the lag imposes penalties for inefficiency, excessive conservatism, and wrong guesses, and offers rewards for their opposites”
 - ▶ See also, E. Warren, E. Bailey, P. Joskow, M. Porter, F. Welch, D. Dismukes
- Much maligned as a “blunt” policy instrument
 - ▶ But purposive in maintaining short-term risk
 - ▶ Price-cap regulation formalizes regulatory lag (e.g., five-year periods)
- Reducing lag reduces revenue and earnings risk
 - ▶ Utilities, rating agencies, and other interests promote practices to reduce lag
 - ▶ Key rationale is that automation/mechanization will reduce rate case frequency/expense
 - ▶ Potential costs from shifting risk, weakening incentives, reducing oversight
 - ▶ Firms facing (global) competition also face information asymmetry and pricing lag
- Utilities rationally try to alleviate lag and maintain earnings
 - ▶ May spend more effort on reducing lag than reducing costs (lean practices)
 - ▶ Methods include cost-recovery and revenue-assurance mechanisms
 - ▶ Certain and expedient cost recovery and rate case time limits (“shot clocks”) shift burdens of proof and risks from investors to ratepayers

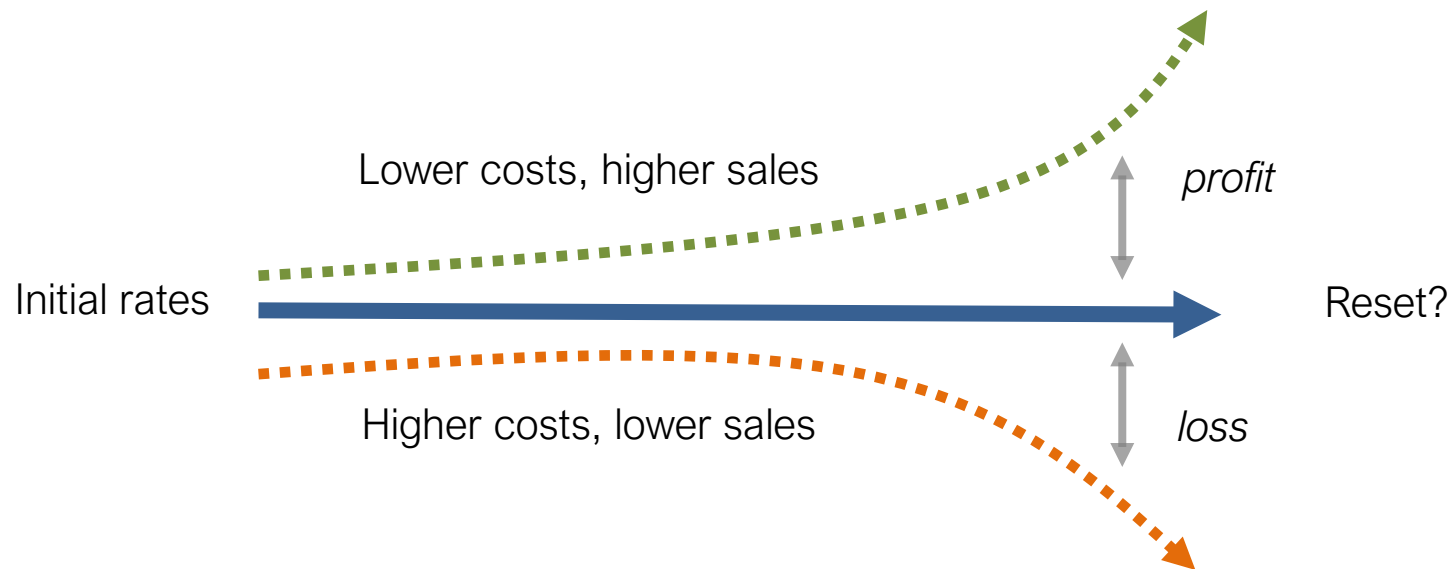
Definitions of regulatory lag

- Formal definition of regulatory lag
 - ▶ Period between a change in costs or revenues (+/-) and a change in authorized prices charged to ratepayers of a regulated utility (regulatory)
- Alternative conceptions of regulatory lag
 - ▶ Period between when an unregulated firm and a regulated firm could put in place a defensive price adjustment (economic)
 - ▶ Period between rate filing and rate authorization (procedural)
 - ▶ Period associated with decision-making process delays (bureaucratic)
 - ▶ Period associated with test years or adjustment mechanisms (rate policy)
 - ▶ Period associated with financial conditions affecting realized returns (financial)
 - ▶ Period between rate-case decisions when prices are capped (practical)



Regulatory vs. utility lag

- Lag presents upside and downside potential – lag “cuts both ways”
 - ▶ During lag, some forces work to the advantage of utilities - utilities should “resort” to rate cases only when necessary (F. Welch, 1954)
 - ▶ Lag may have advantages some municipal utilities, given declining usage
- Not all lag is regulatory – “utility lag” may signal managerial deficiencies
 - ▶ Responsibility for proactively managing through changing conditions and risks
 - ▶ Regulated firms have unique opportunities and tools to address lag
 - ▶ For non-private utilities, making timely adjustments may be easier



Regulatory lag and returns

- Regulators should address lag
 - ▶ When it materially jeopardizes the reasonable opportunity to earn a fair return
 - ▶ Under-earning may be more likely to be addressed than over-earning (asymmetry)
- How regulated utilities can address lag
 - ▶ Better forecasting, strategic management, subsequent cost control
 - ▶ Accounting for elasticities and other relevant factors
 - ▶ Making timely, complete, and convincing regulatory filings
 - ▶ Adoption of emerging technologies and practices

Efficiency trend between rate adjustments

		Increasing operational efficiency	Decreasing operational efficiency
Cost and sales trends between rate adjustments	Falling costs and/or rising sales	Achieving returns is likely	Achieving returns is possible
	Rising costs and/or falling sales	Achieving returns is possible	Achieving returns is unlikely

Lag, risk, and performance

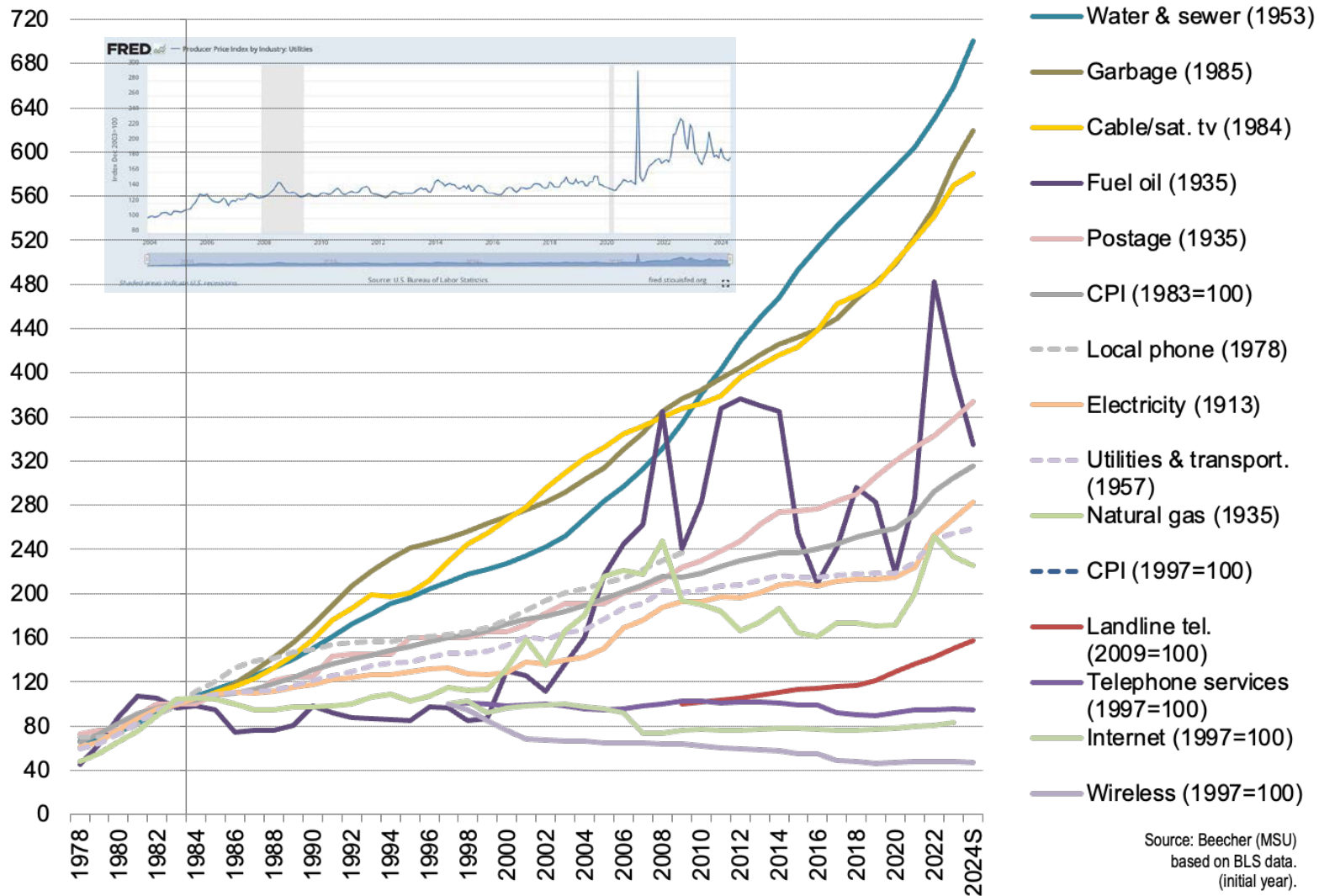
- *“It is a fundamental rule that utility rates are exclusively prospective in nature...[A]bsent extraordinary circumstances, the utility company must bear the risk of loss inherent in the well-known lag accompanying the making of rate changes” (RI Supreme Court in Narragansett Elec. Co. v. Burke, 1977)*
- Lag is a manifestation of regulatory risk and a proxy for competition
 - ▶ As when prices cannot be raised without losing market share
 - ▶ Regulation and lag generally have a “smoothing” effect on prices
 - ▶ Economic conditions such as growth or retraction mask or magnify effects
- Regulatory lag is affected by
 - ▶ Test year, timing of cases, pancaking (overlapping filings), suspension period, agency resources, statutory deadlines, and quality of the filing and evidence (e.g., forecasting)
 - ▶ Projected test years rely on cost forecasting or budgeting to lock in costs
 - ▶ Protections will undermine the incentives provided by lag when efficiency opportunities arise and may also underplay dynamic and interactive effects
- Uncertainty about assumptions and outcomes expands with time

Reducing lag with adjustment mechanisms

- Adjustment mechanisms to reduce lag have proliferated (“mechanization”)
 - ▶ Pushed by industry interests and rationalized by lowering rate case expense
- Cost adjustments: riders, trackers, and surcharges
 - ▶ Originally applied only to variable operating costs meeting four criteria:
 - Substantial, recurring, volatile, and largely outside of utility’s control – e.g., fuel
 - Expanded to include capital-related costs that do not meet these criteria – e.g., DSIC
 - Similarities to construction-work-in-progress (CWIP) in rate base
 - Not “automatic” - must be reviewed and reconciled
- Revenue adjustments: decoupling
 - ▶ Detaches sales from revenues and profit potential
 - ▶ Ultimate adjustment mechanism – creates a revenue cap (vs. price cap)
 - ▶ Similar to weather normalization or other revenue-related mechanisms
- Implications for risk and returns
 - ▶ Risk shifting from shareholders to ratepayers
 - ▶ Reduction in cost and revenue risk call for revisiting returns

U.S. CPI trends: utilities can drive inflation

Trends in the Consumer Price Index (CPI) for public utilities (BLS)

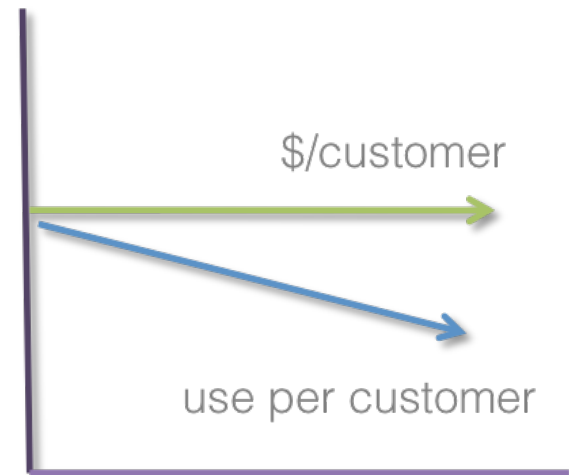


Adjusting for inflation

- Rate cases
 - ▶ Effects on costs and possibly sales
 - ▶ Known and measurable standard
 - ▶ Cost adjustment vs. earnings attrition mechanisms
- Inflation indexes
 - ▶ Price-cap regulation
 - ▶ Small systems
- Utilities may or may not track general inflation
 - ▶ Indexing (CPI, PPI, or sector-specific) may not cover investment needs
 - ▶ Might be self-fulfilling for subsectors
 - ▶ Adjustments undermine incentives
 - ▶ Shields utilities from risk
 - ▶ Possible over-mechanization

Revenue decoupling

- Decoupling is a revenue-assurance mechanism (the ultimate mechanism?)
 - ▶ Comparable to a cost-adjustment mechanism (e.g., DSIC)
 - ▶ Detaches sales from revenues and profit potential – caps revenues (vs. prices)
 - ▶ Similar to weather normalization or other revenue-related mechanisms
 - ▶ Straight fixed-var pricing is decoupling – but decoupling is more than “just rate design”
- Meant to address the presumed “split” or “throughput” incentives (to sell more)
 - ▶ Reactive policy to address nonstationary declining usage and sales due to efficiency in the context of persistent capital intensity – lowering revenue risk
 - ▶ Addresses revenue erosion or attrition by maintaining revenue neutrality per-customer
 - ▶ Does not provide a positive incentive for efficiency (return incentives persist)
- Rate formulas
 - ▶ Traditional: $\text{revenues} = \text{fixed price} * \text{sales}$
 - ▶ Decoupling: $\text{price} = \text{fixed revenue} / \text{sales}$
- Alternatives
 - ▶ Better demand forecasting
 - ▶ Frequent rate adjustments
 - ▶ Rate or revenue stabilization funds



Concerns about decoupling

- Decoupling conflicts with
 - ▶ Consumer sovereignty and dynamic price signals about value
 - ▶ Concept of variable capacity costs and long-term optimization
 - ▶ Competition, market forces, and dynamic pricing (reinforces status quo)
 - ▶ Risk allocation under regulatory compact (guarantees of profit and recovery of uneconomic “stranded” costs)
- Decoupling issues
 - ▶ Public utilities are not meant to be “revenue maximizers”
 - ▶ Decoupling is largely reactive and compensatory
 - ▶ Water usage has fallen dramatically largely without decoupling
 - ▶ Utilities enjoy higher sales but can do little to actualize them, except under-price
 - ▶ Presumes utility role in conservation and need for special incentives (see water)
 - ▶ Publicly owned utilities can make more frequent adjustments
 - ▶ Mandates and standards are likely more effective to achieve efficiency goals
 - ▶ Too little attention to equitable alternatives to allocation based on sales
 - ▶ Methods of (de)coupling also matters to efficiency and equity
 - ▶ Rationale varies over time and by utility sector – and not all utilities favor

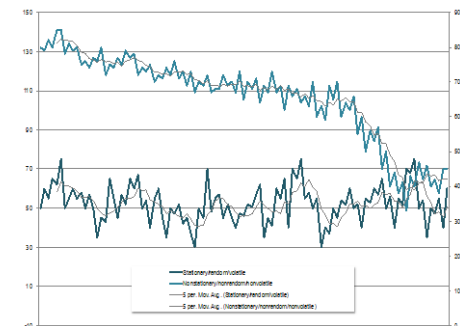
Concerns (continued)

- Reasons for changes in demand cannot be easily isolated
 - May be due to recession, price elasticity, or other forces
 - Partial decoupling attempts to targeting only purposive or mandated reductions
- Intractable problem for utilities is the investment (not sales) incentive
 - ▶ Private utilities are motivated by investment opportunity
 - ▶ Decoupling makes utilities indifferent about sales only if the allowed return is close to the cost of capital to minimize preference for capital spending (S. Kihm)
 - ▶ Revenue caps have been strongly criticized (M. Crew and P. Kleindorfer; K. Costello)
- A somewhat languid tool and not a panacea for the incentives problems

Alternatives to decoupling

- To address revenue shortfall and compensate utilities (reactive)
 - ▶ “Organic” decoupling with more efficiency and stability over time (i.e., do nothing)
 - ▶ More frequent rate cases to address utility lag in strategic response (gradualism)
 - ▶ Prospective (forward-looking) test year for both costs and sales
 - ▶ Evidence-based rate design to provide stability from inelastic usage blocks
 - ▶ Demand-suppression adjustments to account for price elasticity effects
 - ▶ Cost or revenue adjustment mechanisms (with performance, earnings checks)
 - ▶ Alternatives for recovery of fixed costs (e.g., service level, property value)
 - ▶ Improved demand forecasting and modeling (beyond moving averages)
 - ▶ Rate or revenue stabilization funds with appropriate ring--fencing

- To encourage efficiency investment by utilities (proactive)
 - ▶ Resource and asset planning that recognizes demand dynamics
 - ▶ Conditional franchises to include resource efficiency goals
 - ▶ Specification of reasonable capacity utilization profiles
 - ▶ Application of prudence and used and useful standards
 - ▶ Incentive-based returns based on performance and outcomes
 - ▶ Use of incentives must consider risk and equity effects



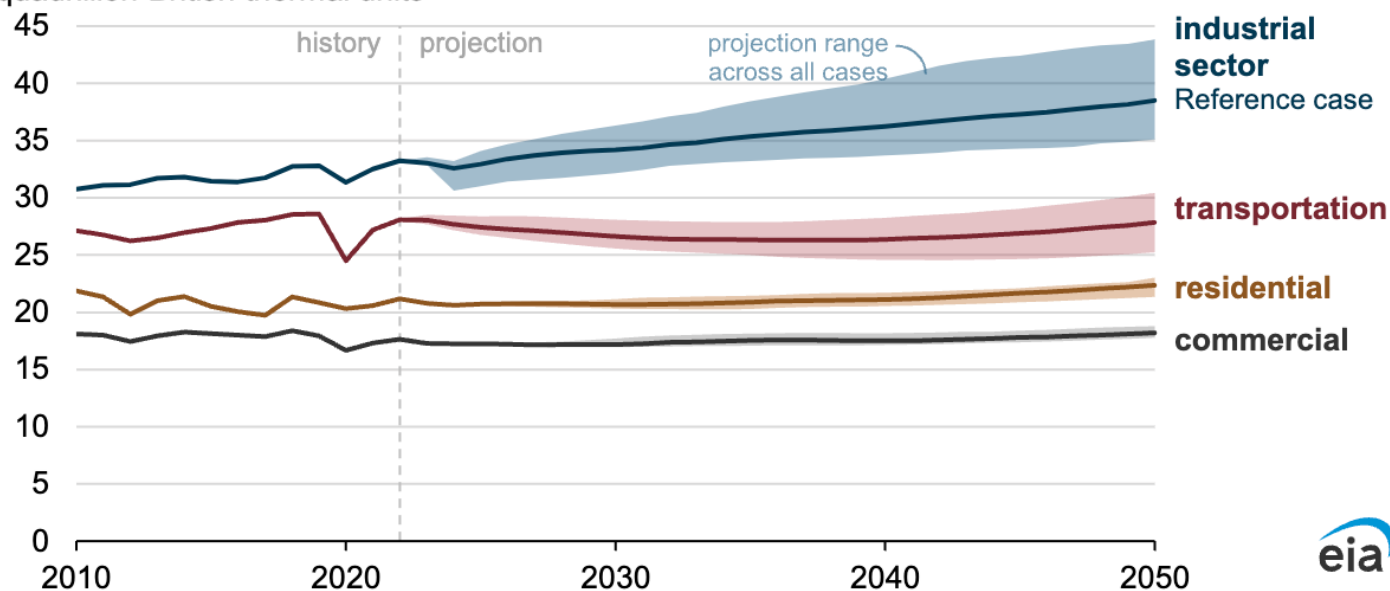
From death spiral to electrification

APRIL 3, 2023

U.S. energy consumption increases between 0% and 15% by 2050

Total energy consumption by end-use sector, United States (2010–2050)

quadrillion British thermal units

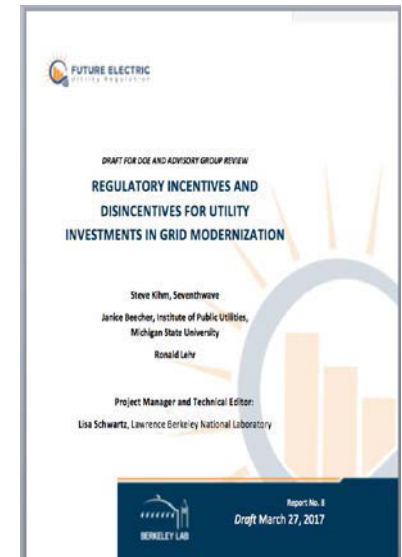


Data source: U.S. Energy Information Administration, [Annual Energy Outlook 2023](#) (AEO2023)

Consumption of all forms of energy increases in the United States between 0% and 15% from 2022 to 2050 in our [Annual Energy Outlook 2023](#) (AEO2023). Our projection of growth in U.S. energy consumption is the result of the effects of economic growth, population growth, and increased travel offsetting continued energy efficiency improvements.

Regulatory incentives: parsing regulatory fact and fiction

- Incentives that favor capital expenditures: the spending propensity
- Incentives that favor rate base treatment: the technology neutrality issue
- Incentives that favor selling output: the throughput motive
- Incentives that favor high fixed charges: the rate-design dilemma
- Incentives that favor centralized technologies: the prosumer problem
- Incentives that favor the status quo: the innovation challenge



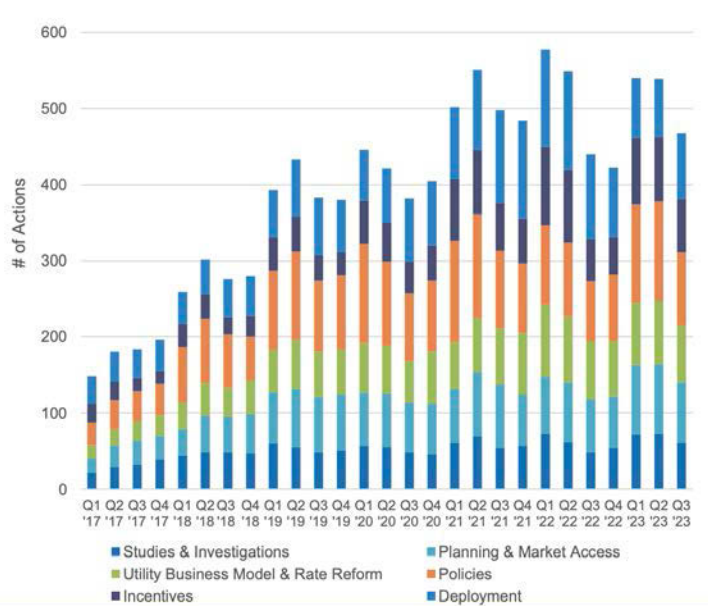
Poll 5: Do utilities need incentives?

- Do utilities need incentives to upgrade and modernize infrastructure?
 - A. Yes
 - B. No
 - C. Sometimes

Incentives that favor capital expenditures: the spending propensity

- Given the strong incentives for capital investment under the RBROR model, the insinuation that it may stand in the way of grid modernization by regulated utilities seems a bit disingenuous
- Three spending propensities
 - ▶ Capital investment generally
 - ▶ Averch-Johnson effect (capex over opex)
 - ▶ Temptation to gold plate

Figure 2. Total Number of Grid Modernization Actions by Quarter



Global Research

7 March 2017

Public Service Enterprise Group More Ratebase Please

Robust Ratebase Remains the Case: exceeds expectations on utility prospects

With ratebase growth continuing at a 7-9% CAGR target through '21, our 8.4% est lines up nicely against this spending level. In a novel twist relative to the usual updates provided at its Analyst Day, mgmt. outlined the 'upside to the upside' capex, delineating clear near-term ongoing projects that could drive addit'l spend through the period-and enabling visibility to 30B+ ratebase by '26. This incl advanced metering (to be filed likely in parallel with the existing rate case later in '17 for \$1B+ program likely in '19+ period), energy efficiency/solar, grid hardening (incl moving to non-wooden poles). It would appear that bill inflation rather than paucity of investments remains the key impediment with approval from the NJ BPU also a similarly challenging hurdle to justify economics on upgrades. Mgmt made its case, meeting expectations on concerns for a slowing trajectory after yrs of low-risk successful expansion.

Equities

Americas
Electric Utilities

12-month rating **Buy**

12m price target **US\$50.00**
Prior: US\$49.00

Price **US\$45.11**

RIC: PEG.N BBG: PEG US

Trading data and key metrics

52-wk range US\$47.32-39.57

Market cap. US\$22.8bn

Shares o/s 506m (COM)

Free float 100%

Industry finances and investment (EEI data)

Industry Capital Expenditures

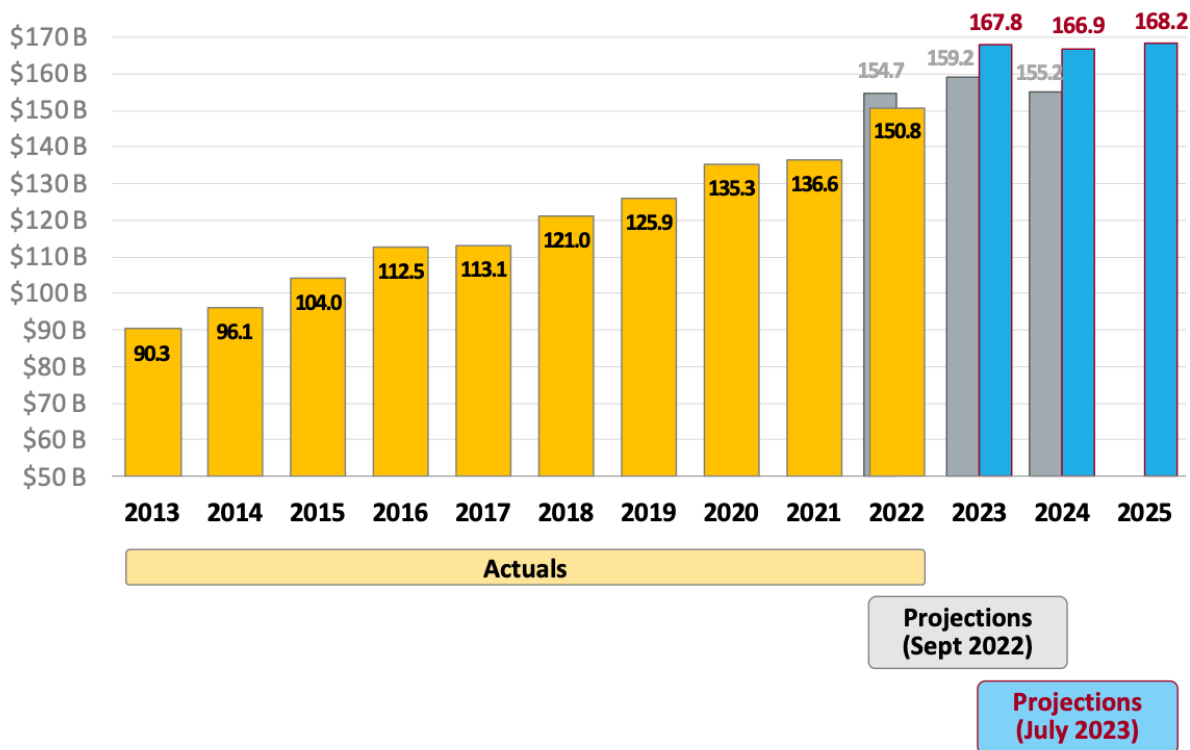


Chart represents total company spending of U.S. Investor-Owned Electric Utilities, consolidated at the parent or appropriate holding company.

Note: At the industry level, CapEx tends to be overestimated for the current, or first, year’s projection and underestimated for the two following years. We expect a continued level of elevated spending after accounting for the historical trend of over- and underestimation.

Source: EEI Finance Department, member company reports, and S&P Global Market Intelligence (updated July 2023).

Incentives that favor rate base treatment: the tech-neutrality issue

- Ratebase treatment is a solution in search of all problems
- Cloud computing
 - ▶ Rare example of moving from capex to opex in the modernization context
 - ▶ Effectively “monopolizes” a nonmonopolistic (potentially competitive) function
- NARUC resolution (2016)
 - ▶ Supportive but maintains a prudent investment test: “Regardless of how cloud computing is treated for regulatory accounting purposes, regulators will still examine whether the investment is prudent...”
- Considerations
 - ▶ Advanced by interested parties – ethical issues
 - ▶ Illinois rejected the proposal in 2020
 - ▶ Need for regulatory professionals to weigh in

NARUC Urges State Regulators to Allow Utilities to Include Investments in SaaS in Rate Base, Unlock the Potential of Cloud Computing



FEATURE

Why NARUC wants state regulators to incentivize utility cloud computing

Allowing utilities to earn a return on cloud-based software could help them better serve customers and operate the modern grid

Incentives that favor selling output: the throughput motive

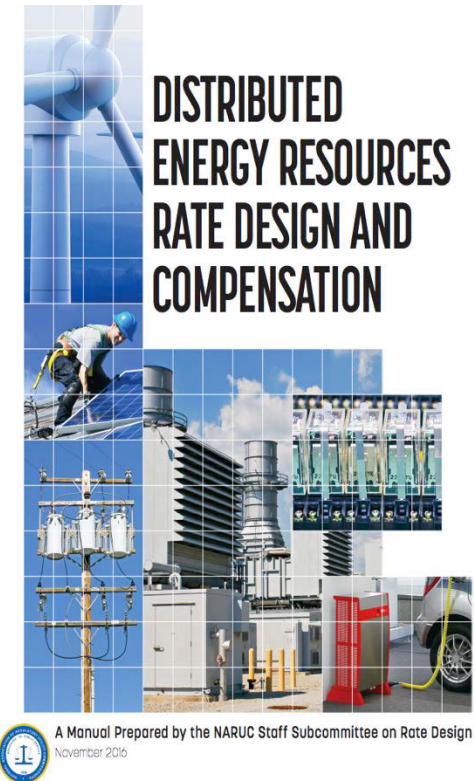
- Is there a throughput motive?
 - ▶ Utilities enjoy higher sales but can do little to grow them but underprice
 - ▶ Between cases, they will focus more on what they can control – costs
- Decoupling is meant to “neutralize” the throughput incentive
 - ▶ Largely reactive and compensatory – utilities are not “revenue maximizers”
 - ▶ Demand may change due to changing preferences, elasticities, and economic forces
 - ▶ As a counterpoint, water usage has fallen dramatically largely without decoupling
- Theoretical issues
 - ▶ Disconnecting output from prices
 - ▶ Economics-based critique of revenue caps
 - ▶ Any effect is overwhelmed by investment incentive ($r > k$)

Fixed vs. variable charges: tradeoffs

Recovering more costs from fixed charges	Recovering more costs from variable charges
Static view of infrastructure (more sunk costs)	Dynamic view of infrastructure (less sunk costs)
Enhances revenue stability (less sales revenue risk to utility)	Reduces revenue stability (more sales revenue risk to utility)
Weakens price signals (less resource efficiency)	Strengthens price signals (more resource efficiency)
Familiar & understandable but less acceptable (more predictable and less controllable)	Familiar & understandable but more acceptable (less predictable and more controllable)
Less affordable for low-income households (more regressive)	More affordable for low-income households (less regressive)
Encourages self supply and grid defection (may raise some costs)	Preserves grid supply and participation (may lower some costs)
Possible advantage for combined households (one fixed customer charge)	Possible stability from first blocks (relatively inelastic usage)

Incentives that favor centralized technologies: the prosumer problem

- Assumptions about scale are changing
 - ▶ Prosumerism appears to be on the rise
 - ▶ Other demographic trends may contradict
- Utility pricing must consider both efficiency and equity for different customers
 - ▶ Interclass and intraclass
 - ▶ Program participants and nonparticipants
- Alternative methods of rate design can be accommodated by the traditional paradigm
 - ▶ Emerging pricing models for net metering



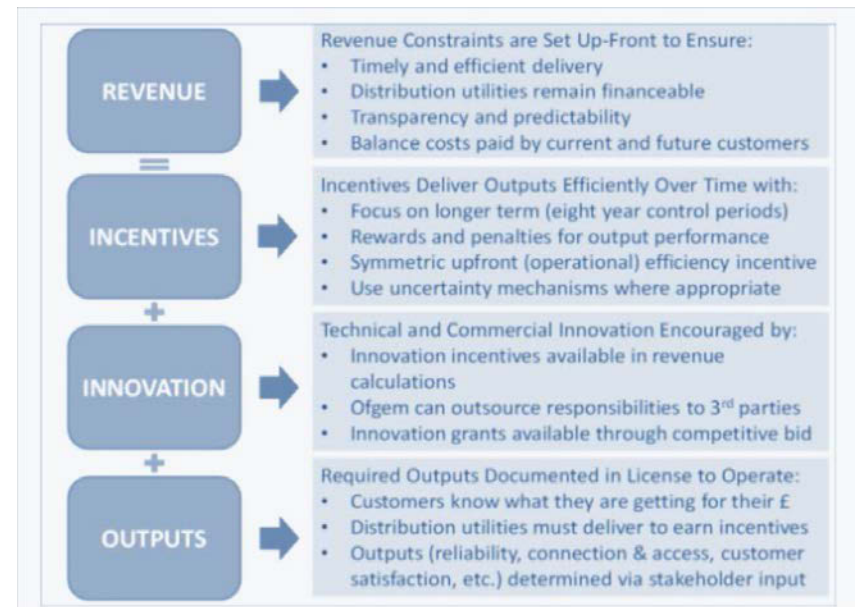
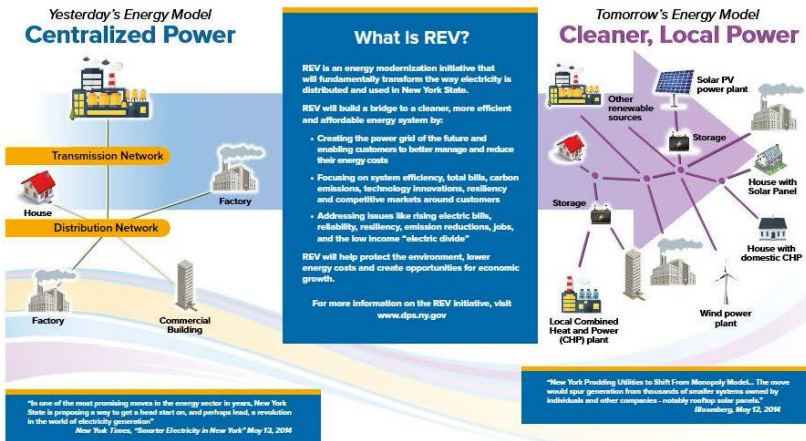
Incentives that favor the status quo: the innovation challenge

- Innovation has always been a challenge for public utilities
 - ▶ Innovation is not necessarily incompatible with grids, monopoly, or regulation
 - ▶ Utilities will benefit from innovation that reduces costs between cases
 - ▶ Modernization will involve investment in innovative technologies
- Modern utilities are optimizers under dynamic supply and demand conditions
- New York's REV and UK's RIIO as case studies

REV: Reforming the Energy Vision



New York State is leading the nation in developing new policies to encourage and reward consumers to use new technologies to control energy use.



Incentives to upgrade distribution infrastructure: DSIC

- Distribution system improvement charges (DSIC)
- Concerns
 - ▶ Overuse that shifts risks from shareholders to ratepayers
 - ▶ Narrows scope of review (single-issue ratemaking)
 - ▶ Asymmetrical and unidirectional (matching principle)
 - ▶ Neglects interrelated revenue and expenditure effects
 - ▶ Automates recovery and limits review of prudence
 - ▶ Distorts CAPEX vs. OPEX incentives and deployment
 - ▶ Rate-case savings at cost of performance
 - ▶ Weakens incentives for planning and optimization
 - ▶ Undermines disciplinary effect of lag

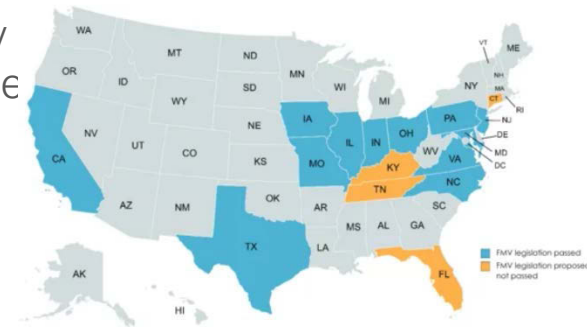
Poll 6: Valuation

- How should utility assets be valued?
 - A. By original cost less depreciation
 - B. By the cost of replacement
 - C. By an independent appraisal
 - D. By the agreed-to price of a buyer and seller

Incentives for acquisitions: fair market value

- “Fair market value” defined
 - ▶ As allowed by law and policy, the price paid by IOUs for publicly owned utility assets following appraisal and negotiation processes which may diverge from book value – original cost of the assets net of depreciation
 - ▶ Successfully challenged in Pennsylvania in 2023 (ongoing)

- Purchase prices above “value”
 - ▶ Historically, above-value “goodwill” (under GAAP) was used to address special circumstances
 - ▶ “Acquisition adjustments” above book have been allowed at the discretion of the regulator for private-to-private acquisitions considered in the public interest and benefitting ratepayers
 - ▶ Under “fair market value” both buyer (IOU) and seller (city) want a higher sale price that ratepayers will pay
 - ▶ Inflates asset value and the cost of service
 - ▶ Incompatible with consolidated rates due to wealth transfer



“Goodwill”

“Acquisition
adjustment”

“Fair market value”

Incentives for acquisitions: fair market value

- Overturns firmly embedded policy, precedent, accepted practice (original cost)
- Undermines performance incentives under the regulatory compact
- Transfers wealth from ratepayers to taxpayers that may not be co-located
- Directly at odds with water affordability goals due to inflationary effects
- Requires repayment of prior federal grants used for infrastructure
- Invalidates consolidated pricing (STP) based on taxpayer and ratepayer equity
- Reflects political negotiation (“willingness to sell”) rather than market proxies
- Presumes prudence of pending capital investment (pre-approval)
- Circumvents regulatory oversight of rates and other terms of service
- Aggressive pressure on legislatures, regulators, and municipalities
- Disregards alternative options for capturing scale and professional capacities

Inflationary effects on revenue requirements

- Ratepayers will pay for improvements and compliance regardless
 - ▶ Privatization is a means of *financing* – *not funding*
 - ▶ Monopoly transfers arguably should be at net book cost
- Fair market value compounds the effects of privatization and full-cost pricing
 - ▶ Offsetting efficiency gains and avoided costs may be marginal
 - ▶ Empirical evidence on the effect of ownership on performance is mixed
 - ▶ Advantages privatization over municipalization (uneven structural competition)
- Inflationary effects
 - ▶ Original cost less depreciation (rate base) *plus*
 - ▶ More depreciable rate base (return of capital) *plus*
 - ▶ Higher cost of private debt financing *plus*
 - ▶ Cost of equity capital (risk/return premia on capital) *plus*
 - ▶ Capital infusion (new rate base investment) *plus*
 - ▶ Spending propensity (RBROR incentives) *plus*
 - ▶ Income and other taxes on private corporations (vs. equivalents) *plus*
 - ▶ Overhead (holding company administrative & general expense)

Connecticut statement (2019)

- *“The approach contained in the proposed bill, often deemed a “Fair Value Legislation”, is contrary to long-standing and well-established regulatory precedents in Connecticut and most states nationally...”*
- Importantly, both the water utility and the municipality are financially incentivized towards a higher valuation and purchase price.
- Under this legislation, PURA would not be allowed to consider other relevant evidence or to adjust the purchase price if it finds that the purchase price or valuation is unreasonable.
- Additionally, the evaluation methodology prescribed in the proposed bill is flawed as it fails to adjust the system valuation for necessary future capital improvements or other problems and liabilities identified in the municipal system.
- While ten states have recently adopted some form of fair value methodology, the limited results of municipal system acquisitions in those states to date illustrate that this type of legislation results in inflated purchase prices and higher utility rates for state residents.
- PURA and OCC cannot support the valuation methodology and ratemaking approaches proposed in this bill.”
- Source: <https://cga.ct.gov/2019/ETdata/Tmy/2019SB-00222-R000219-Betkoski%20&%20Katz-PURA%20&%20OCC-TMY.PDF>

Pennsylvania case (2023)

- Patrick M. Cicero vs. Pennsylvania Public Utility Commission (910 C.D. 2022, filed July 31, 2023)
- Aqua Pennsylvania sought to acquire the wastewater system assets of East Whiteland Township
- The Commonwealth Court found that “The Commission erred and/or abused its discretion in concluding that Aqua established substantial **affirmative public benefits that outweighed the acknowledged harms** of Aqua’s acquisition of the System **as required by Sections 1102 and 1103** to support the approval of the Application and grant of the CPC.10 Therefore, we reverse.”

Pa. court reverses PUC decision on East Whiteland sewer sale to Aqua

Pa.’s Commonwealth Court recently ruled on the side of ratepayers in a major Office of Consumer Advocate case against the Public Utilities Commission and Aqua.

Incentives for water conservation: expenses on balance sheet

- WaterNow Alliance
 - ▶ “Governmental Accounting Standards Board (GASB) standards allow water agencies to debt fund” conservation programs or “distributed infrastructure.”
 - ▶ “Water utilities with rates regulated by city councils, utility governing boards, or state commissions generally meet all three criteria, and therefore may apply GASB 62 where relevant.”

- A parallel argument has been made to count natural resources as assets

Exhibit 3: Control of Asset Mechanisms for Distributed Water Options

	Easement	Real Property Lease	Personal Property Lease	Lien	Title	Contract
Water-Efficient Indoor Appliances						
Cash-for-grass, Xeriscape, Permeable Pavement, Green Rooftops, Bioswales, Rain Gardens						
Greywater System, Drip Irrigation						

■ Likely
 ■ Potentially
 ■ N/A

Incentives for prudence

- Prudence is expected
 - ▶ Earns the opportunity to earn a fair return under the compact
 - ▶ Bonus returns should be used very sparingly and could be targeted
 - ▶ Managerial incentives may be less expensive than shareholder incentives
- Reconciling concept of incentives for *voluntary investments*

BRIEF

Energy sector divided over transmission incentives for voluntary cybersecurity investments



How water utilities can prepare and plan for climate change impacts

If you are responsible for a utility providing drinking-water supply, these are the risks that climate change poses to your operation, planning and the population you serve.

Climate change is altering weather patterns leading to extreme floods and droughts which will affect water resources and therefore drinking-water supply systems.

Infographic by www.chris-wells.com

Pandemic as a known risk (2005)

Resolution for State Commissions' Action Relative to Pandemic Preparedness

WHEREAS, A Pandemic is a global disease outbreak caused by a virus for which there is little or no immunity in the human population that causes serious illness and then spreads person-to-person worldwide and many scientists believe it is only a matter of time until the next pandemic occurs; *and*

WHEREAS, During the 20th century there were 3 pandemics: the 1918 influenza pandemic caused at least 500,000 U.S. deaths and up to 40 million deaths worldwide; the 1957 influenza pandemic caused at least 70,000 U.S. deaths and 1-2 million deaths worldwide; and the 1968 influenza pandemic caused about 34,000 U.S. deaths and 700,000 deaths worldwide; *and*

WHEREAS, When a pandemic emerges, its global spread is considered inevitable and although measures such as border closures and travel restrictions may delay the arrival of the virus but cannot stop it; *and*

WHEREAS, When a pandemic occurs a substantial percentage of the world's population will require some form of medical care and medical systems throughout the world will be severely depleted in the attempt to provide care to the people who have become ill; *and*

WHEREAS, A school, government, or business that is closed during a pandemic will result in economic hardship and absenteeism; *and*

WHEREAS, When a pandemic occurs, it is necessary to ensure that critical functions are maintained in effectively regulated companies; *and*

WHEREAS, Plans for continuity of operations developed in 2001; *now there be*

RESOLVED, That the National Association of Regulatory Utility Commissioners (NARUC), convened in its November 2005 Annual Convention in Indian Wells, California, encourages State commissions to initiate dialogue no later than first quarter 2006 and/or continue current communication with their regulated companies about their continuity of operations planning including ensuring that critical personnel receive inoculation on a priority basis as they relate to a potential pandemic; *and*

RESOLVED, That such plans be reviewed and updated on an annual basis, be robust in assuring staffing for critical functions through cross training, permit modification of operation to enhance telecommuting or remote dispersal of personnel to minimize disease transmission, and be responsive to the potential of travel restrictions affecting the general movement of the population.

*Sponsored by the Ad Hoc Committee on Critical Infrastructure
Recommended by the NARUC Board of Directors November 15, 2005
Adopted by the NARUC November 16, 2005*



Pandemic Planning Resources

NARUC's 2005 Committee on Critical Infrastructure's Resolution for State Commissions' Action Relative to Pandemic Preparedness:
<http://www.naruc.org/Resolutions/CI-3PandemicPreparedness.pdf>

Novel H1N1 Information and Guidance from the CDC:
<http://www.cdc.gov/h1n1flu/business/>

FluView from the CDC:
<http://www.cdc.gov/h1n1flu/update.htm>

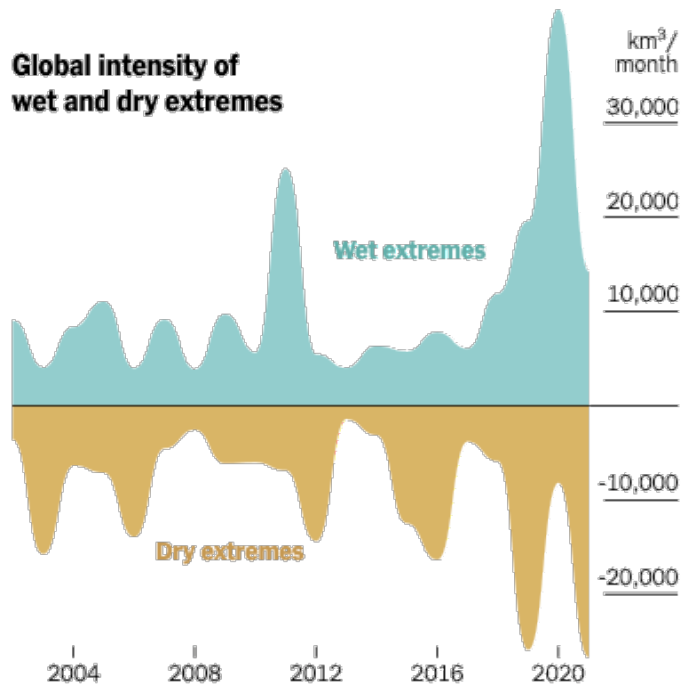


RESOLVED, That the National Association of Regulatory Utility Commissioners (NARUC), convened in its November 2005 Annual Convention in Indian Wells, California, encourages State commissions to initiate dialogue no later than first quarter 2006 and/or continue current communication with their regulated companies about their continuity of operations planning including ensuring that critical personnel receive inoculation on a priority basis as they relate to a potential pandemic; *and be it further*

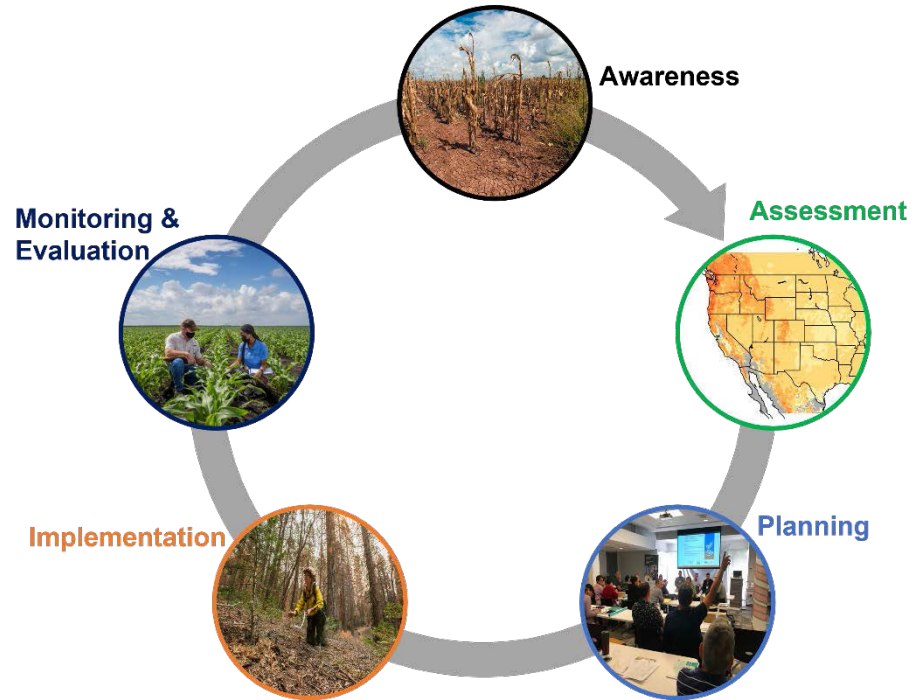
RESOLVED, That such plans be reviewed and updated on an annual basis, be robust in assuring staffing for critical functions through cross training, permit modification of operation to enhance telecommuting or remote dispersal of personnel to minimize disease transmission, and be responsive to the potential of travel restrictions affecting the general movement of the population.

Climate change as a known risk

- Prudence calls for mitigation as well as adaptive resilience planning



Source: Rodell and Li, *Nature Water* (2023), based on analysis of NASA Grace and Grace-FO data. Note: Multi-year events are assigned to the year with peak intensity.



Adapted from the Fourth National Climate Assessment (2018)

Need for “all-threats” planning (2005-2016)



N A R U C
National Association of Regulatory Utility Commissioners

**NARUC Committee on Critical Infrastructure
Pandemic Fact Sheet for Continuity of Essential Operations**

Avian (or bird) flu is an influenza virus that occur naturally among wild birds. The H5N1 variant is deadly to domestic fowl and can be transmitted from birds to humans. There is no human immunity and no vaccine is available. When bird-to-human transmission has occurred, it has resulted in a high rate of fatalities; however, there has been very little bird-to-human transmission of this virus to date.

Pandemic is any virulent human disease that causes a global outbreak of serious illness. Because there is little natural immunity, the disease can spread easily from person to person. Currently, there is no pandemic flu based on HNS1, but it has qualities that have alerted public health and emergency management decision-makers to the importance of preparedness for this **high-consequence, low-probability threat**.

Critical Infrastructure Training Workshop
for the NCSL Task Force on Energy Supply

San Antonio, TX, August 7, 2011
National Association of Regulatory Utility Commissioners

Miles Keogh
Christina Cody

Funded by a contract with the
US Department of Homeland Security

High-Impact, Low-Frequency
Event Risk to the North American
Bulk Power System

A Jointly-Commissioned Summary Report of the
North American Electric Reliability Corporation
and the U.S. Department of Energy's November
2009 Workshop

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

June 2010
www.nerc.com | www.doe.gov

Conducting an Energy Emergency Tabletop Exercise in Your State: A Step By Step Guide

December 2010
Miles Keogh, Director, Grants & Research
The National Association of Regulatory Utility Commissioners (NARUC)

Funded under a cooperative agreement with the U.S. Department of Energy

NARUC

Risk Management in
Critical Infrastructure
Protection:
An Introduction for
State Utility Regulators

Miles Keogh
Sharon Thomas
NARUC Research Lab

September 2016

With support from the U.S.
Department of Energy

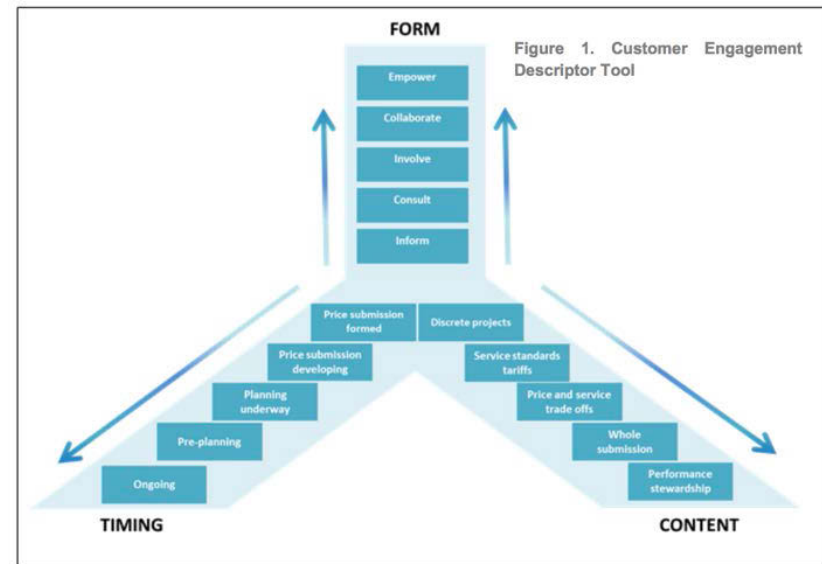
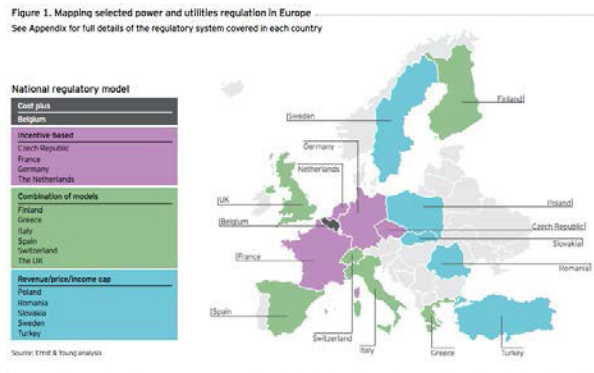
The National
Association
of Regulatory
Utility
Commissioners

One team's ranking of risk for catastrophic events, Denver, 2016

EVENT	PROBABILITY	VULNERABILITY	CONSEQUENCE	RISK
Storms	High	Medium	Medium	High-medium
Cyber attack	Low	High	High	High
Electromagnetic pulse	Low	Medium	High	Medium
Downed trees	High	High	Low	Medium
Flooding	Medium	Medium	Medium	Medium
Pandemic	Low	Medium	High	Low

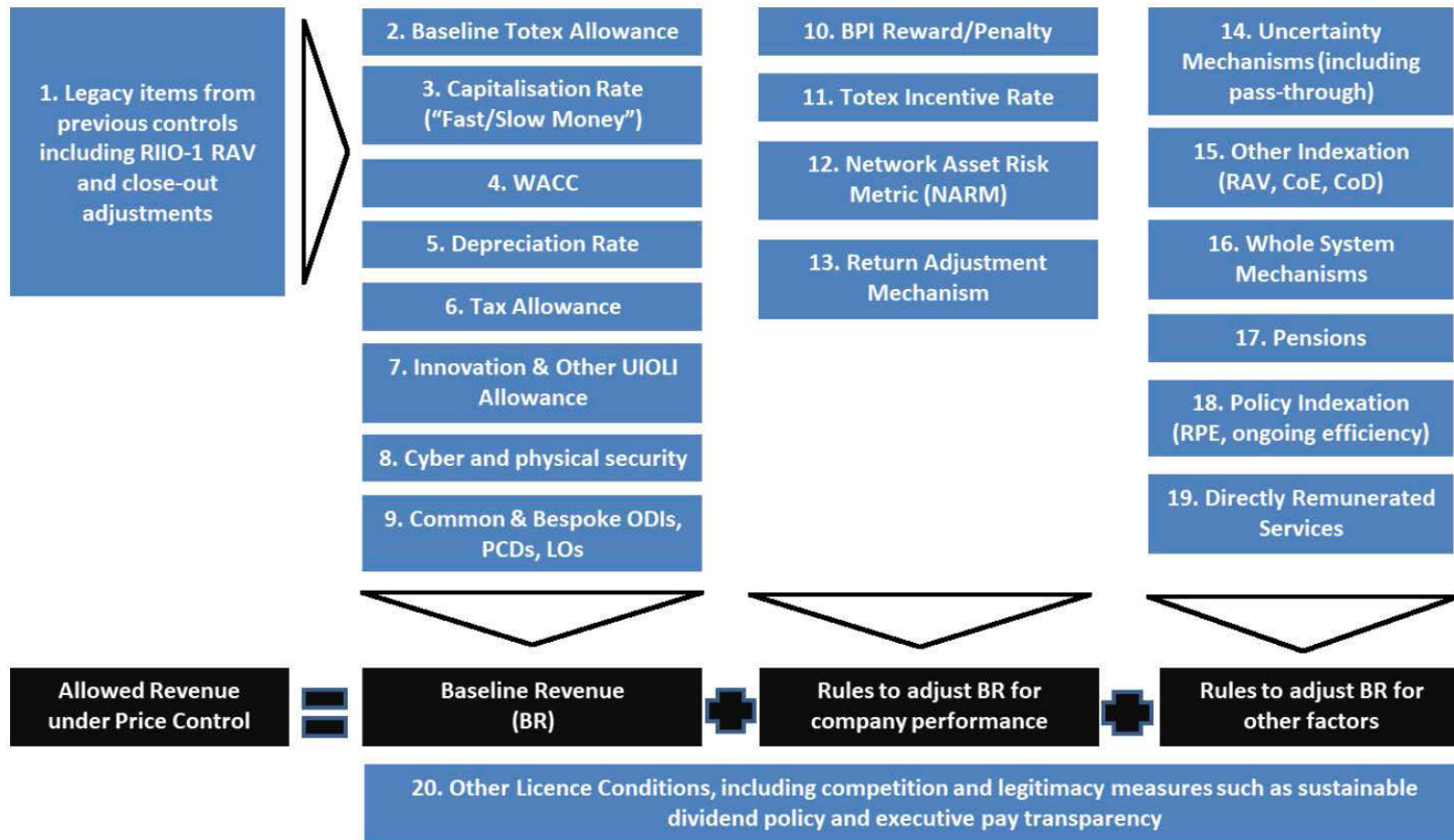
Economic regulation is a global experiment

- Alternative regulatory models – more evolutionary than revolutionary
 - ▶ Focus more or less on costs, revenues, returns, and prices
 - ▶ Raise concerns about loss of regulatory oversight and discretion
- Alternative models
 - ▶ Performance-based (benchmarking, yardstick), price and revenue caps, multi-year rates, earnings bands, revenue or profit sharing, formula ratemaking, bonus returns
 - ▶ Hybrid models include RB/ROR for CAPEX and price caps for OPEX
 - ▶ Performance metrics and comparative competition (“yardstick”)
- Emerging
 - ▶ Responsive and consumer-centric regulation
 - ▶ Alternative structural models (ownership)
 - ▶ Public-value theory



U.K.'s RIIO model: Revenue = Incentives + Innovation + Outputs

Figure 3: RIIO-2 Building Blocks



Source: https://www.ofgem.gov.uk/sites/default/files/docs/2020/07/ed2_ssmc_overview.pdf

Can monopolies innovate? Some overgeneralizations

Monopolistic enterprises

- Bureaucratic
- Unclear incentives
- Resistant to change
- Risk aversion

Competitive enterprises

- Entrepreneurial
- Clear incentives
- Open to change
- Risk acceptance

Theory and assumptions about markets, competition, and innovation

- Market structure is likely more relevant than utility ownership
 - ▶ Monopoly is less conducive to innovation absent effective oversight
 - ▶ Privatization is not competition and does not overcome monopoly
- Competition is not a necessary condition for innovation
 - ▶ Competition constrains resources and attention
 - ▶ Lack of competition is no excuse for not innovating
- Oligopolistic or structural competition (public vs. private) and firm scale can enable and motivate dynamic efficiency (continuous improvement)
 - ▶ Large entities can lead innovation
 - ▶ Not all innovation is market-disruptive

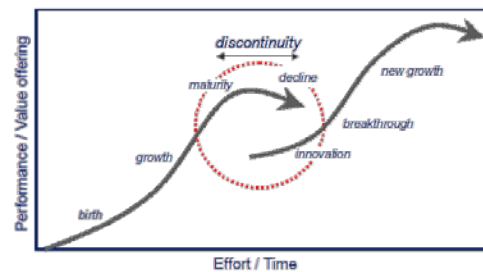
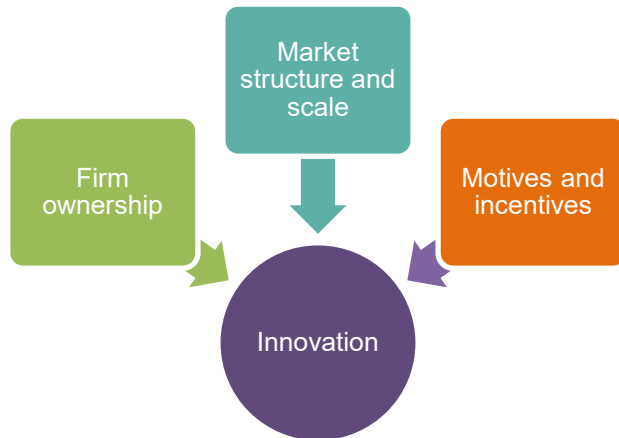
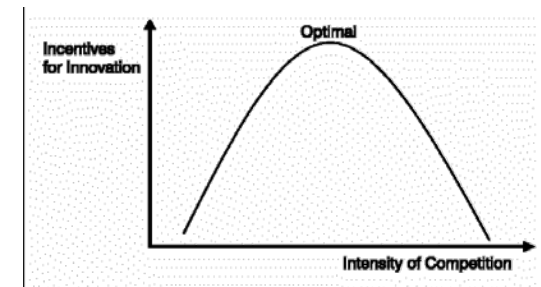


Figure 4. Discontinuity brought on by disruption and “jumping the curve”³
 Source: <http://innovatio.blogspot.com/2012/12/capturing-opportunity-in-disruption.html>



Can the public sector innovate?

- How the government subsidizes innovation
 - ▶ Physical infrastructure
 - ▶ Public education systems
 - ▶ Grants, loans, and tax support
 - ▶ Research laboratories and programs
 - ▶ Procurement policies
 - ▶ Intellectual property protection (patents)
 - ▶ Contests and prizes

- The public water sector can and must innovate

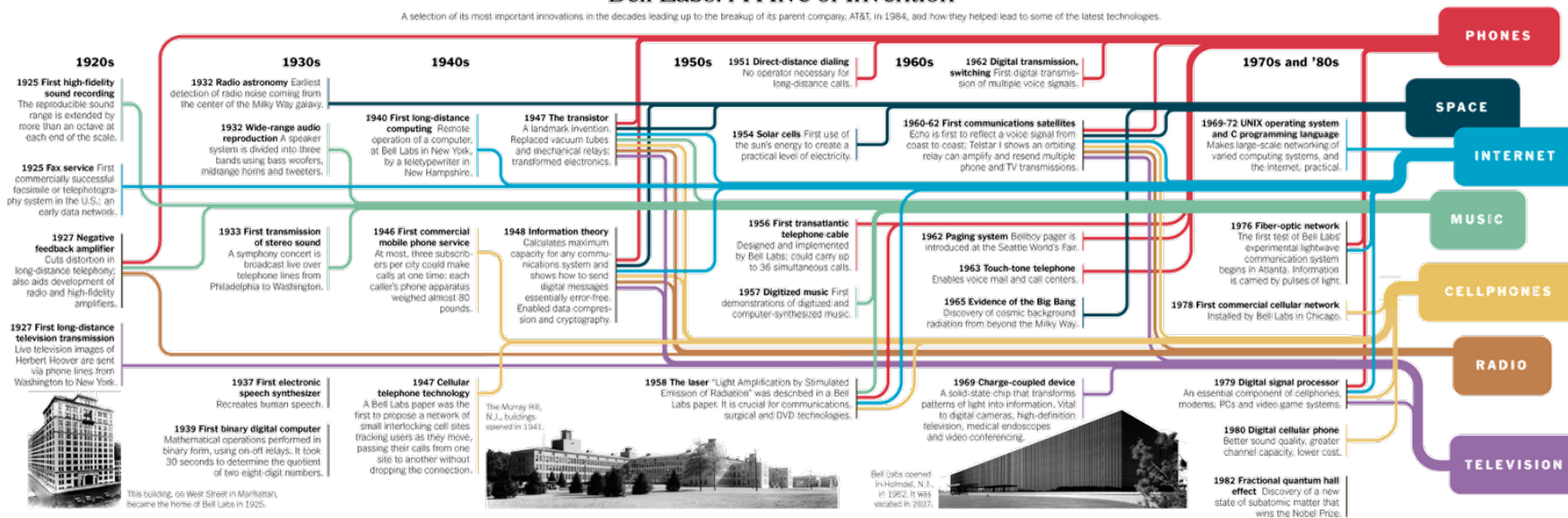
humangenome-project internet tesla-cars
 prosthetics zidovudine-azt genetic-tracing
 simulation-software pbi hydraulic-fracturing
 the-wii autonomous-robots microchips wind-energy
 smartphones cell-sorter supercomputers
 reverse-auctions led-lights dseismic-imaging
 google accelerometers doppler-radar hpv
 weather-apps mris flu-shot gps vela-satellites
 siri barcodes civil-aviation goodyear-tires
 hepatitis-vaccines closed-captioning vaccine
 hybrid-corn lactose-free infant-formula
 fast-multipole haemophilus-vaccine active-learning

Inventions supported by the U.S. government

Can private monopolies innovate? (Bell monopoly)

Bell Labs: A Hive of Invention

A selection of its most important innovations in the decades leading up to the breakup of its parent company, AT&T, in 1984, and how they helped lead to some of the latest technologies.



Source: Alcatel-Lucent



Bell Labs opened in Holmdel, N.J., in 1962. It was vacated in 2007.



BILL MARSH/THE NEW YORK TIMES

LEFT AND CENTER PHOTOS COURTESY OF ALCATEL-LUCENT USA INC. AND THE AT&T ARCHIVES AND HISTORY CENTER; RIGHT PHOTO: EZRA STOLLER/ESTO

Innovation in the sectors seen through the long lens of history



Old American Photos 

1d · 

Workmen laying wooden water pipeline east of Lewiston, Idaho. c.1891.



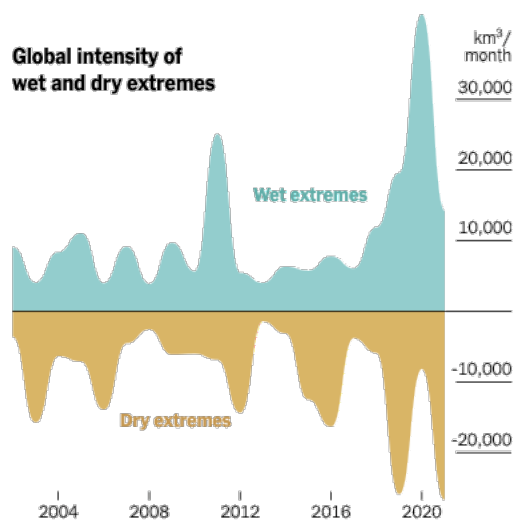
Conservative culture and context shape behavior and favor the status quo

- Utility monopolies tend to be risk-averse regardless of ownership
 - Engineering-driven culture – quality, reliability, and technical path-dependency
 - Fear of catastrophic failure and regulatory enforcement and expansion
- Overcoming risk aversion to embrace innovation
 - Endogenous – governance, leadership, capacities, and partnerships
 - Exogenous – policy and regulatory reform and performance incentives (+/-)
- Utilities and those who oversee them need to make space for innovation

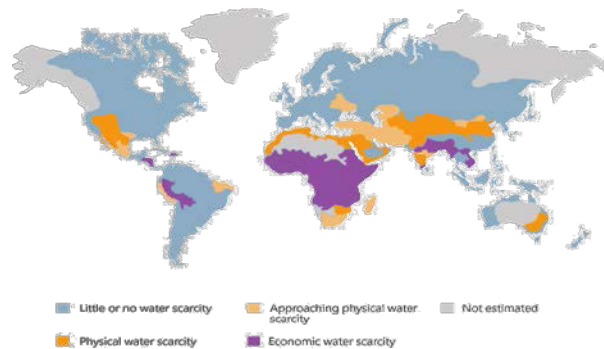


Urgency of innovation: climate, equity, and affordability

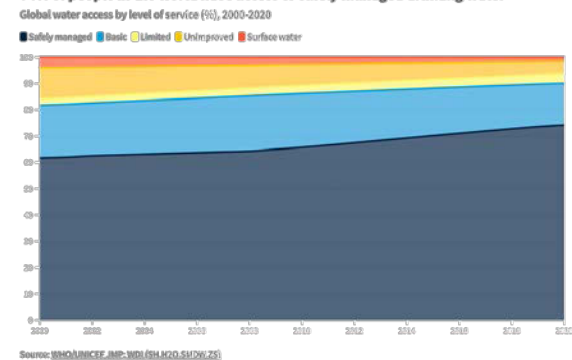
- *“Our need will be the real creator” (Plato’s Republic), as in the proverb, “Necessity is the mother of invention”*



Source: Rodell and Li, Nature Water (2023), based on analysis of NASA Grace and Grace-FO data. ◦ Note: Multi-year events are assigned to the year with peak intensity.

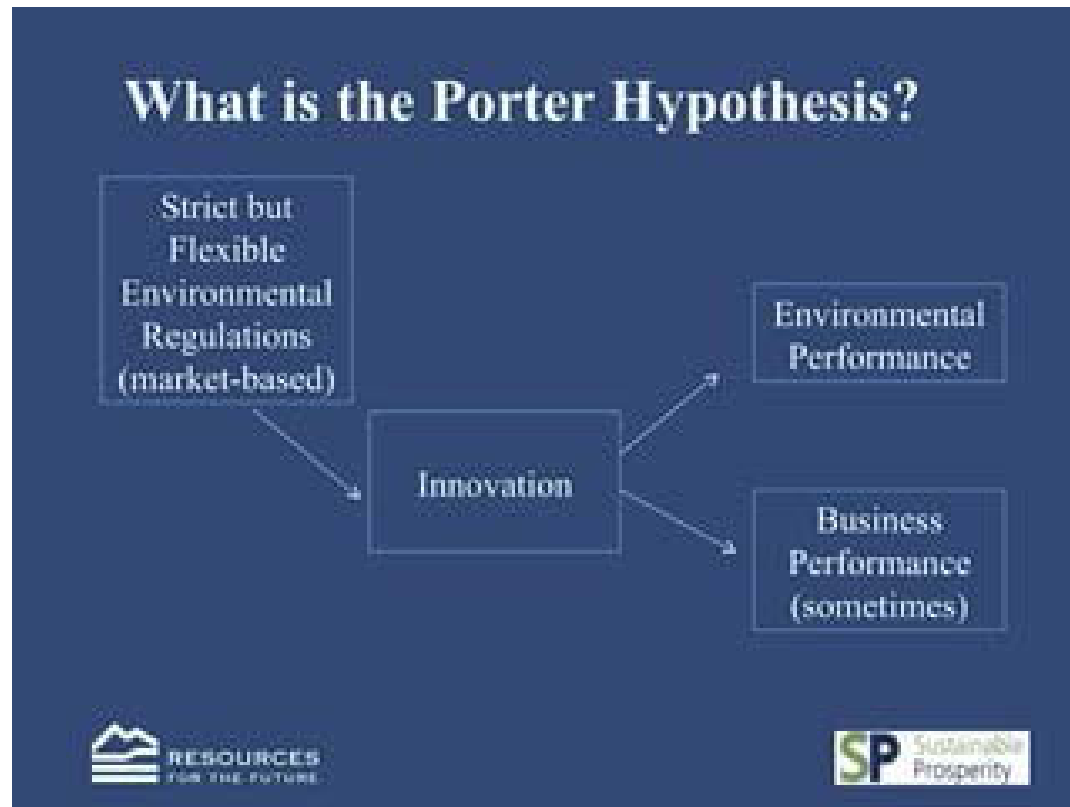


74% of people in the world have access to safely managed drinking water

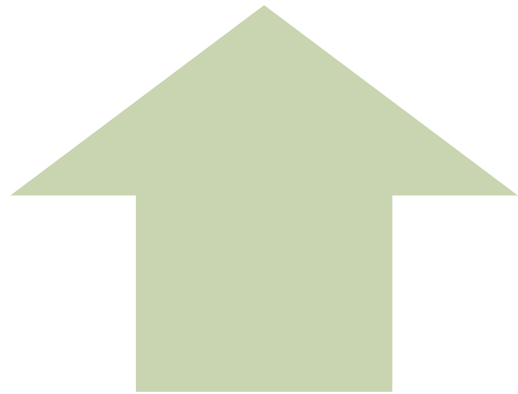


Can regulation motivate innovation?

- *“Strict environmental regulations do not inevitably hinder competitive advantage against rivals; indeed, they often enhance it” (Michael Porter, 1991)*

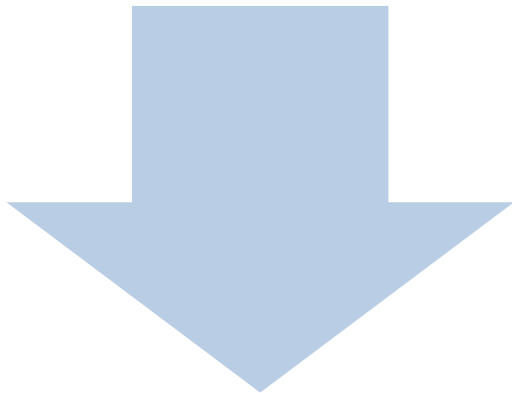


Economic regulation: positive and negative factors



Innovation positive

- Outcome orientation
- Flexibility and experimentation (“sandboxes”)
- Performance standards
- Pilot programs subject to independent evaluation
- Policy coordination and harmonization
- Effective risk-based performance incentives (+/-)



Innovation negative

- Process orientation
- Favoring or technologies or picking winners and losers
- Micromanagement or overreach
- Capture by regulated and special interests
- Lack of policy adaptation to changing conditions
- Shielding utilities from risk that motivates innovation

Normative questions beyond the technocentric and econocentric perspectives: *“Just because we can doesn’t mean we should”*

Will the
innovation be...

Beneficial relative to required resources – and to whom?

In the **public interest** and advance **social progress**?

Prudent, compliant with standards, and protective of consumers?

Consistent with core **principles, values, and fundamental rights**?

Responsive based on inclusive employee and community **engagement**?

Accessible and affordable to those who need it?

Equitable, fair, and just in concept, practice, and outcomes?