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Utility Business Models and Performance-Based Regulation

U.S. Climate Alliance

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Outline

- Background and History
- Utility Business Model Issues and Reform Efforts
- Designing Performance Metrics and Incentives

1 Background and History



In the Beginning...

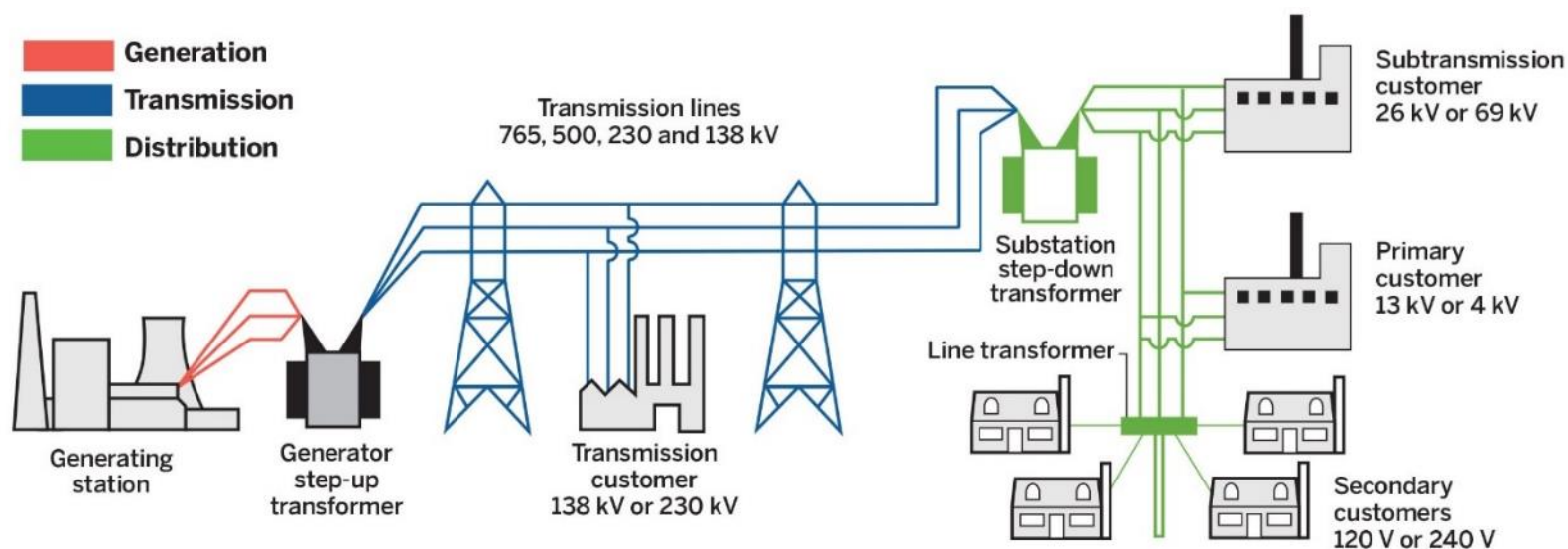
- Early competition to provide electricity service started in cities in late 19th century
 - Related problems of natural monopoly, “wasteful competition” and monopoly pricing
 - Aesthetic and practical issues
- State regulation begins in early 20th century
 - Monopoly service territories
 - “Just and reasonable” rates
- Federal legislation and regulation fills an important role starting in the 1930s
 - “Interstate commerce” gap
 - Break-up of major interstate utility conglomerates
 - Expansion of rural service

Pearl Street Station, first commercial power plant in the United States



Source: Wikipedia. Pearl Street Station

Traditional Electric Utility



Source: Adapted from U.S.-Canada Power System Outage Task Force. (2004). *Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations*

Vertically Integrated Utilities Rule the Earth in the Mid-20th Century

- Majority of electric service provided by investor-owned utilities that owned generation, transmission and distribution assets in a single state
 - Significant minority of service comes from publicly-owned entities and co-ops
- Cost-of-service ratemaking is predominant model
 - FERC Uniform System of Accounts
- Wholesale sales in interstate commerce regulated by FERC
 - Sales to smaller utilities (e.g., munis and coops)
 - Purchased power agreements
 - Informal sales and trading



From the 1960s to Today...

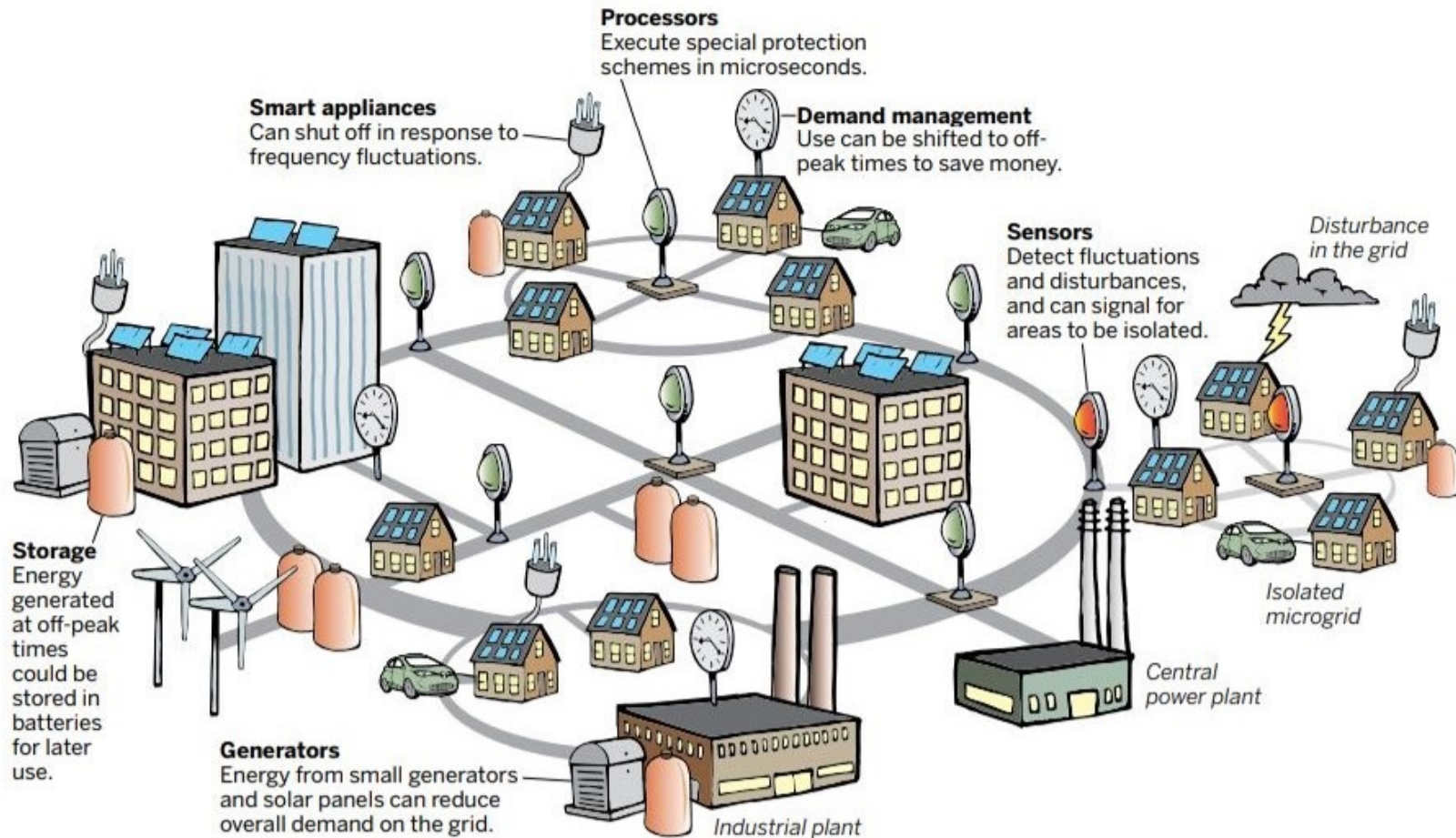
- 1960-1980
 - Emergence of nuclear power and combustion turbines
 - Oil crises and beginning of federal environmental regulation
- 1980-2000
 - PURPA implementation
 - Introduction of energy efficiency programs and demand-side resources
 - Emergence of combined cycle generation
 - Restructuring and RTO/ISO formation
- 2000-2020
 - Major increase in fossil gas extraction from hydraulic fracturing
 - Repeal of Public Utility Holding Company Act of 1935 and proliferation of mergers
 - Emergence of utility-scale wind and solar, distributed generation, advanced meters and smart grid

To Infinity and Beyond...

- Massive increases in computing power and data storage capabilities
- High penetrations of variable renewable resources change operation and economics of electric system
- Energy management technology becomes cheap and widespread
- Electrification of transportation and heating brings challenges and opportunities
- Continued cost declines for clean distributed generation and energy storage



Illustrative modern electric system



Source: Adapted from U.S. Department of Energy. (2015). *United States Electricity Industry Primer*

Decarbonized and decentralized!

A New Landscape

- Data ownership and protection
- Vastly expanded set of resource options
- Changing reliability risks
- New markets, programs and retail pricing structures
- New institutions and bureaucracies
- Massive conglomerates own local utilities

Utility Business Models and Reforms



How do we get a monopoly
investor-owned utility to
satisfy the public interest?

And not solely maximize
shareholder value?

Why and how do we regulate utilities?

- Public policy goals
 - Efficient competition and control of monopoly pricing
 - Reliable provision of service
 - Societal equity (e.g., universal access and affordability)
 - Economic development
 - Environmental and public health requirements
- Principles for setting utility rates
 - Effective recovery of revenue requirement
 - Customer understanding, acceptance, and bill stability
 - Equitable allocation of costs
 - Efficient forward-looking price signals

Simplified rate-making process

**Determine
revenue
requirement**

Net rate base
(Plant in service – depreciation reserve)

X

Rate of return

+

Depreciation expense
(Plant in service x depreciation rate)

+

Operating expense
(Fuel + purchased power + labor + labor overheads + supplies + services + income taxes)

+

Other taxes

=

\$ millions

**Allocate
costs among
customer
classes**

Residential

Commercial

Industrial

Street lighting

**Design
retail rates**

Dollars
per month

Cents
per kWh
peak

Cents
per kWh
off-peak

Dollars
per month

Cents
per kWh
peak

Cents
per kWh
off-peak

Dollars
per month

Cents
per kWh
peak

Cents
per kWh
off-peak

Dollars
per kW
monthly

Dollars
per light
per month

Issues with Traditional Monopoly Investor-Owned Utility Regulation

- Cost-plus revenue structure provides little incentive for cost control
- Throughput incentive means that increased sales lead to higher profits
- Incentive to make large capital investments but little incentive to operate reliably and efficiently
- Little incentive to utilize non-utility energy resources
- Many public policy goals are outside a strict scope of economic regulation

Wide World of Solutions

Ratemaking solutions

- Prudence review of investments and expenses
- Future test year or alternative rate base calculations
- Decoupling and “revenue regulation”
- Multi-year rate plans
- Earnings sharing mechanisms
- Adjustment clause (tracker) reform

Structural solutions

- Integrated planning
- Programs and procurements for non-utility resources
- Restructuring and competition
- Environmental regulations

Measuring and incentivizing performance has both structural and ratemaking aspects!

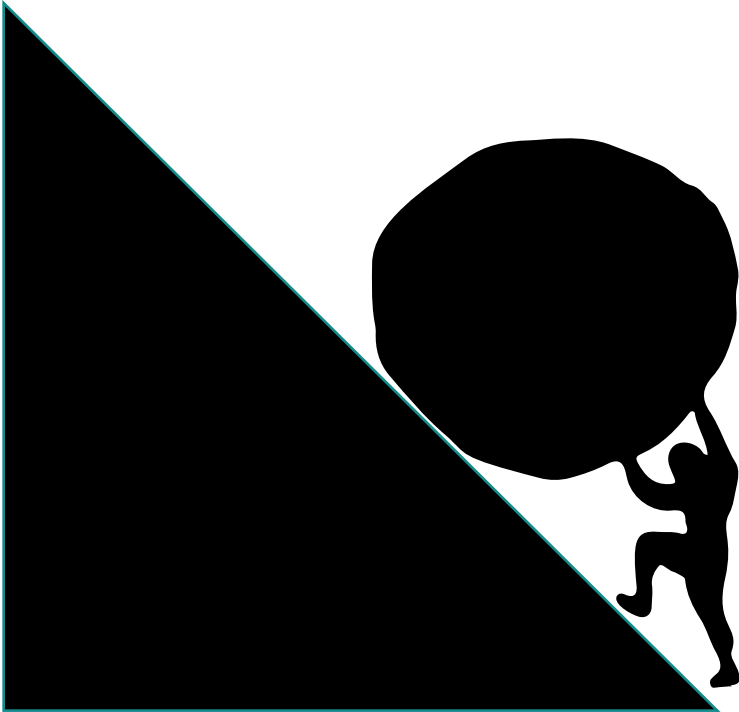
3 Designing Metrics and Performance Incentives



Measuring and Incentivizing Performance

- Informal regulatory monitoring and oversight
- Data reporting requirements – “metrics”
- Rankings and targets
- Financial performance incentives and penalties

Matching the Problem and Solution



Key Distinctions and Debates

- Program management versus overall utility management
- Inputs, outputs or outcomes
- Level of utility influence and control
- Penalties, incentives and distribution of risk and reward

Set Guiding Goals



Examples:

- Make/keep energy affordable for customers
- Improve distribution system reliability
- Reduce GHG emissions

Create and Track Metrics

Examples:

- Average monthly bills for residential customers
- Frequency & duration of customer outages
- Utility emissions? Electric sector emissions?
Economywide emissions?

Financial Performance Incentive Options

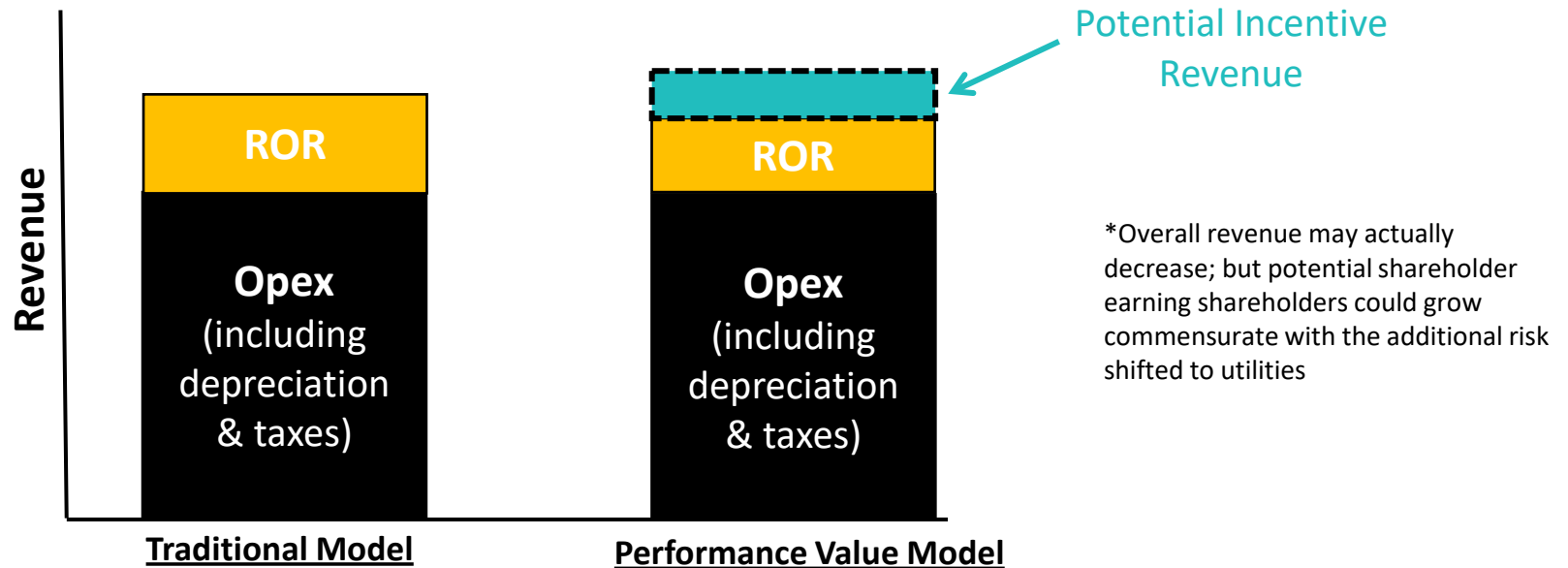
- Return on equity bonuses or penalties
 - Still tied to rate base
- Incentives defined by \$ amounts
 - Tied to program budget or net earnings
- Shared savings mechanisms
 - Baseline measurement can be difficult

Hard Issues

- Lack of clarity around measurement methodology or potential for gaming
 - Can the utility “juke the stats”?
- Question of utility control
 - What if a given metric is significantly influenced by weather or economic conditions?
- How much incentive is too much?
 - Costs and benefits of individual incentive or overall regulatory scheme?
- How big is the hurdle you need to overcome?
 - Need to understand value and drivers of existing behavior

A Package of Reforms

Pair positive-only performance incentives with reduction in baseline return on equity



About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org



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