Collecting Allowed Revenues When Demand is Declining

PRESENTED TO:

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PRESENTED BY:

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THE Brattle GROUP

Agenda

Framing the Problem

Options for Mitigating Volume Risk

Case Studies

The problem: Utility tariffs do not reflect utility cost structures

Cost categories	Utility's Costs	Customer's Rates
Variable ($/kWh) - Fuel/gas supply - Operations & maintenance	Variable = $60	Variable = $115
Fixed ($/customer) - Metering & billing - Customer service	Fixed = $10	Fixed = $5
Size-related (demand) ($/kW) - Transmission capacity - Distribution capacity - Generation capacity	Demand = $50	

Note: Illustrative example for an electric utility.

This misalignment between rates and cost structure creates a revenue recovery risk

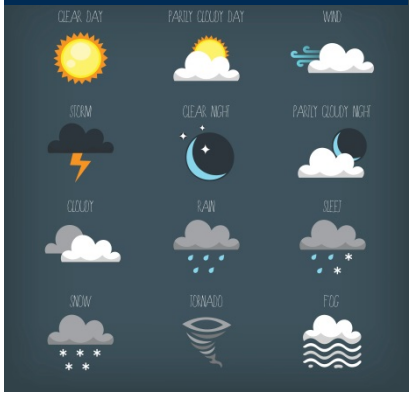
Utilities are at risk to under-recover their authorized revenues if actual consumption and demand differ from what is underlying the applicable billing determinants.

Some factors that impact utilities' volumetric throughput are:

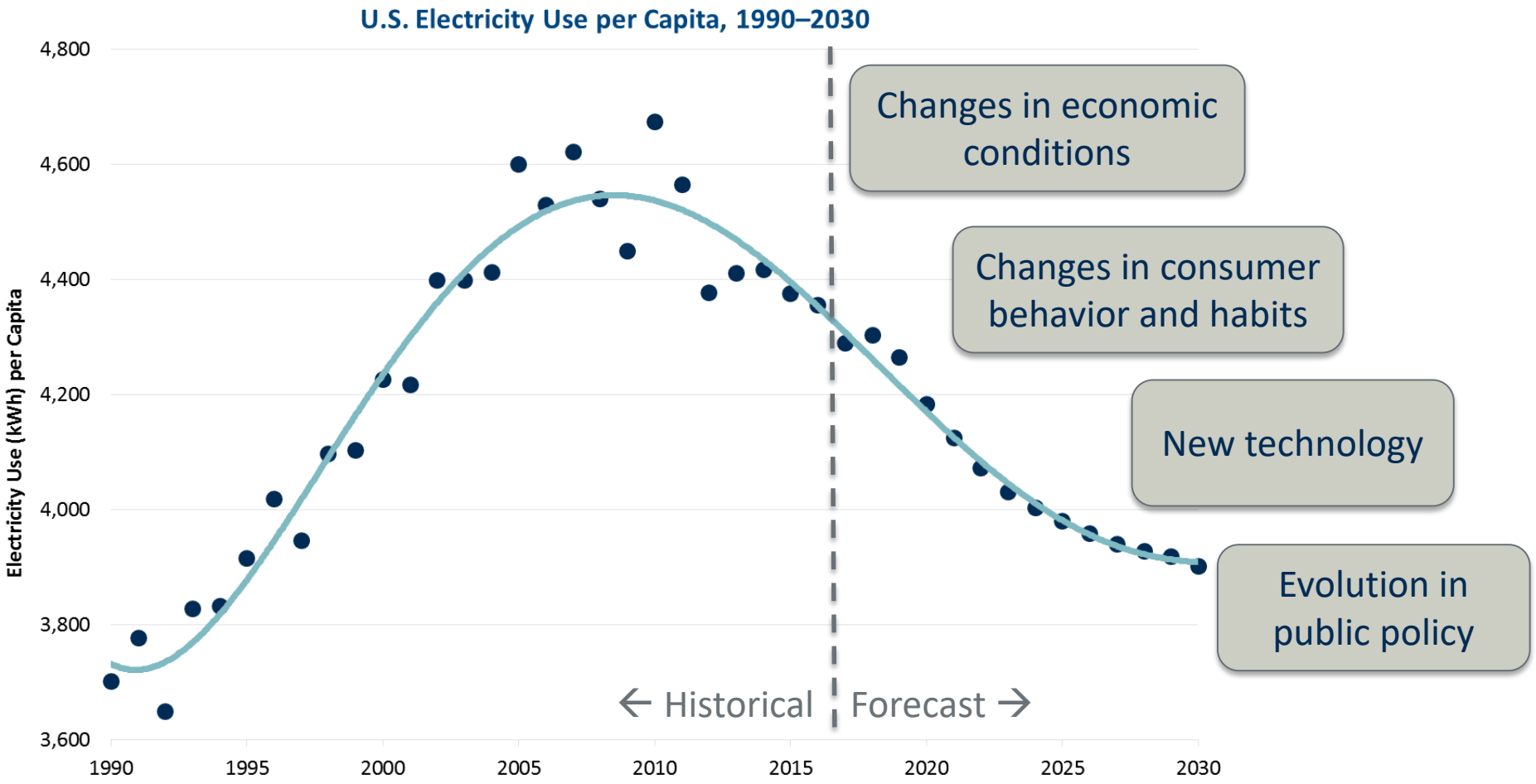
Customer Growth

Usage per Customer

Weather



Use per customer is declining and is projected to continue falling



Sources: Historical residential electricity sales from the U.S. Energy Information Administration's (EIA's) Form 861M and population estimates as of July 1 from the U.S. Census Bureau (estimates calculated in 2000, 2010, and 2016 for previous years). Projected sales (2017 onward) from EIA's reference case in its Annual Energy Outlook 2017. Forecast population (2017 onward) taken from U.S. Census Bureau's 2014 national population projection.

Utilities throughout the world have been working toward reducing this throughput risk

While many jurisdictions have already implemented some regulatory mechanisms to reduce their throughput risk, the mechanisms used can differ significantly

… how effective are the various mechanisms implemented at mitigating volume risk?

… how are different utilities including mechanisms to decouple throughput and revenue in their regulatory construct?

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One option utilities have is to align rate design with their cost structure

Relying on fixed charges makes revenue less dependent on throughput

- Determine variable charge based on incremental cost to the utility of a customer's consumption – recovering the remainder in the fixed charge

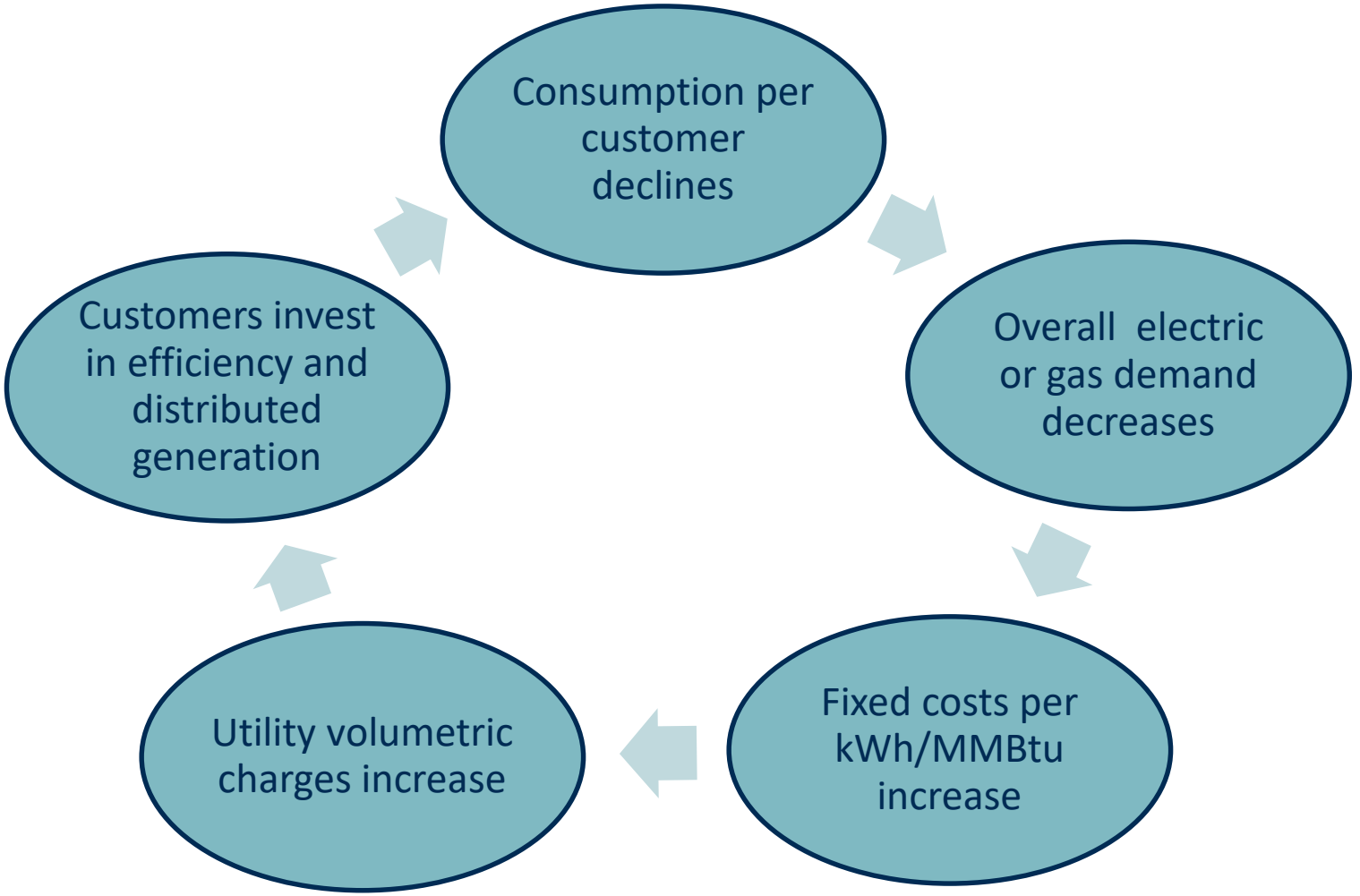
Some steps toward more cost-reflective rates have been taken

- Increasing fixed charges
- Adding demand charges to residential and small general service rates
- Creating separate customer classes for new technologies and distributed generation

However, rate design is also driven by other forces (e.g., fairness, bill stability), so some stakeholders have resisted fully cost-reflective rates

The second-best option to manage throughput risk is the use of regulatory mechanisms such as "true-ups"

Without changes in rate design, declining use per customer will impinge negatively on utility finances



Different regulatory mechanisms cover different levels of risk and provide different incentives

Mechanism	Throughput Risks Covered	Risks of Delayed Recovery (Regulatory Lag)	Conservation Incentives for the Utility
Full True Up	✓ Decline in usage per customer ✓ Decline in number of customers ✓ Variability in weather	Covers differences between forecast and actual billing determinants in future years	Broad
Weather Normalization Mechanism	✓ Variability in weather	Covers differences between forecast and actual weather impacts in future years	N/A
Lost Revenue Adjustment Mechanism	✓ Targeted revenue loss from expected impact of policy goal	Differences between forecast and actual losses may or may not be trued up in future years	Specific

Designing a mechanism to reduce throughput risk involves some tradeoffs

Covering more risk vs. reducing rewards

- e.g., weather normalization mechanism (retaining profit gains when number of customers grow) or full reconciliation

Straightforward implementation vs. incentivizing specific conservation programs

- e.g., reconciliation with authorized revenues or true-up based on kWh savings actually measured from utility programs

Reducing regulatory lag vs. ensuring cost recovery

- e.g., cost-reflective rate design in place before customer consumption or true-ups in future years

Greater oversight of utility costs vs. more efficient ratecases

- e.g., setting multi-year rate plans with rebasing of billing determinants and costs or allowing rates to adjust to static revenue requirement with true-up mechanisms

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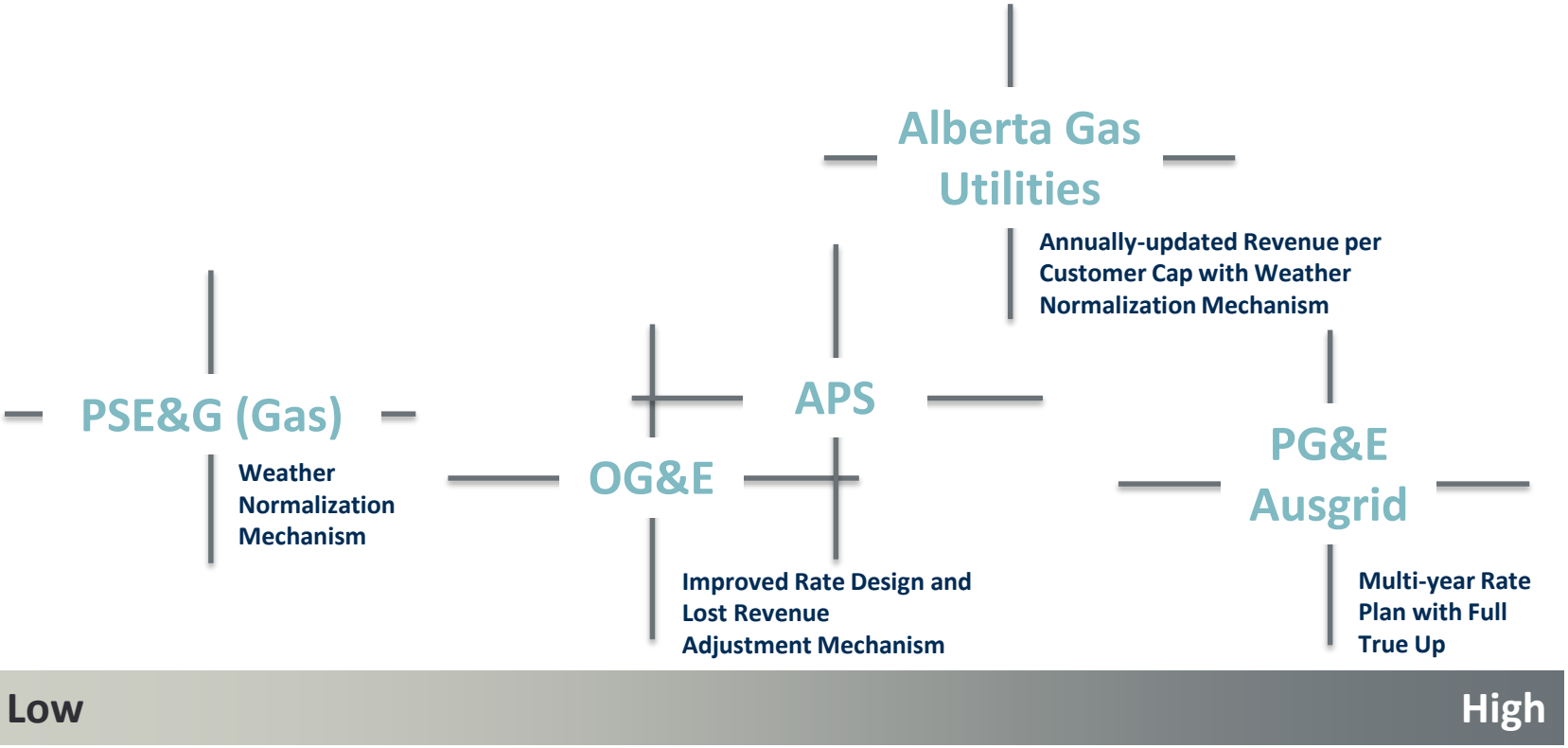
A broad spectrum exists



Mitigation of Throughput Risk

Where do we go from here?

On the revenue side, some utilities are "putting a band-aid" while others are passing the throughput risk to customers…

- First-best approach: better rate design
- Second-best approach: full true-ups; weather or lost revenue adjustment mechanisms

… but what about changes in cost between test years?

Should the ideal combination be the following?

- Fix rate structure to get more efficient pricing
- Use a true up to ensure that authorized revenue is collected
- Adjust authorized revenue each year to reflect anticipated changes in cost

Presenter Information

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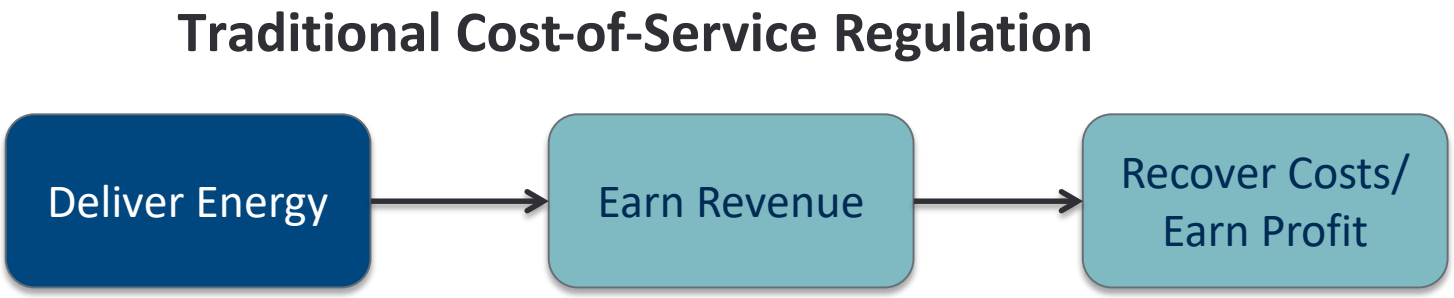
Note: Henna will be departing from the firm this summer to attend graduate school, so her personal contact information is shown above.

Henna Trewn is a senior research analyst in *The Brattle Group's* San Francisco, CA office. She supports utilities, energy companies, and government organizations across North America, Europe, and Australia on ratemaking methodology, renewable finance, market development, rate design, and business risk. She has past experience in energy and environmental policymaking at the local, state, and federal levels. Ms. Trewn holds a B.A. in Political Economy from the University of California, Berkeley.

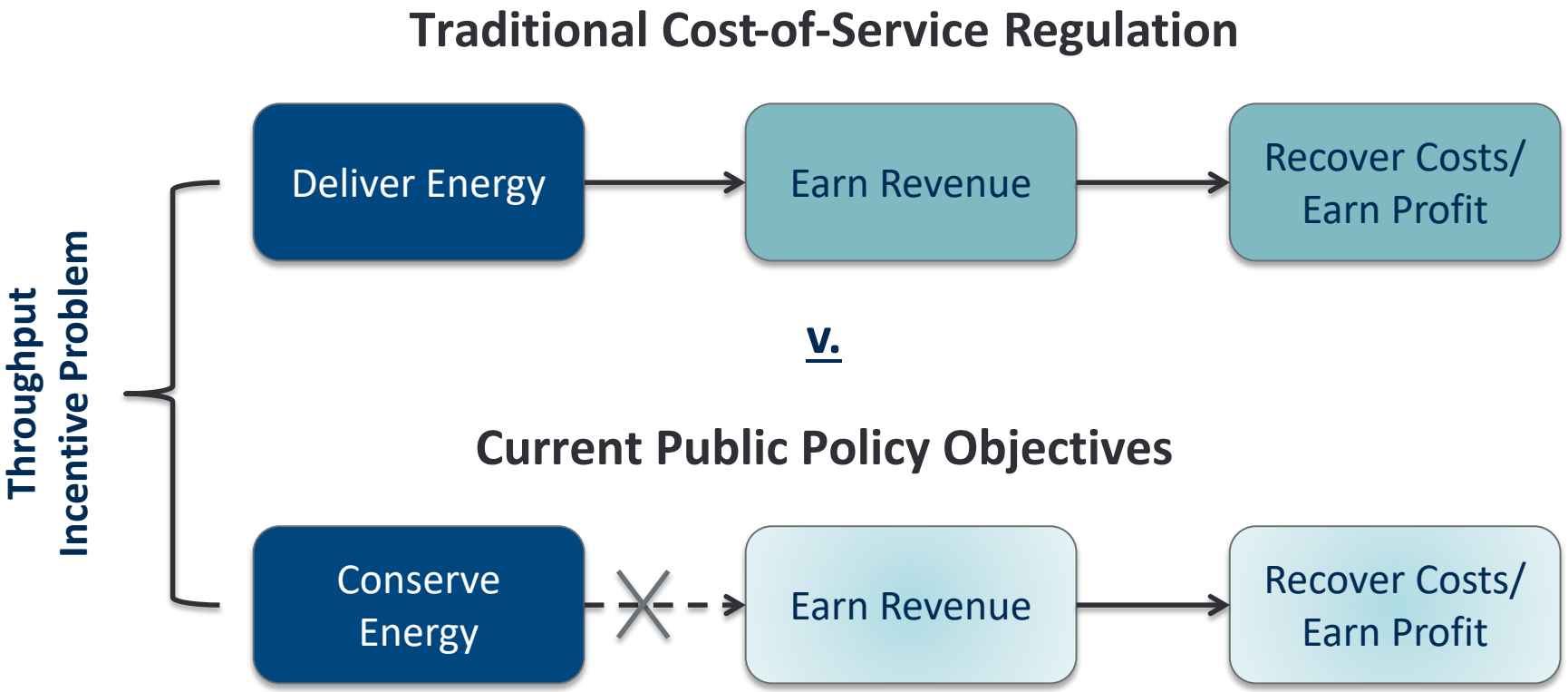
Further questions on this presentation may be directed to Ms. Trewn or to Léa Grausz and Ahmad Faruqui (corresponding authors) at Lea.Grausz@brattle.com and Ahmad.Faruqui@brattle.com, respectively.

Appendix

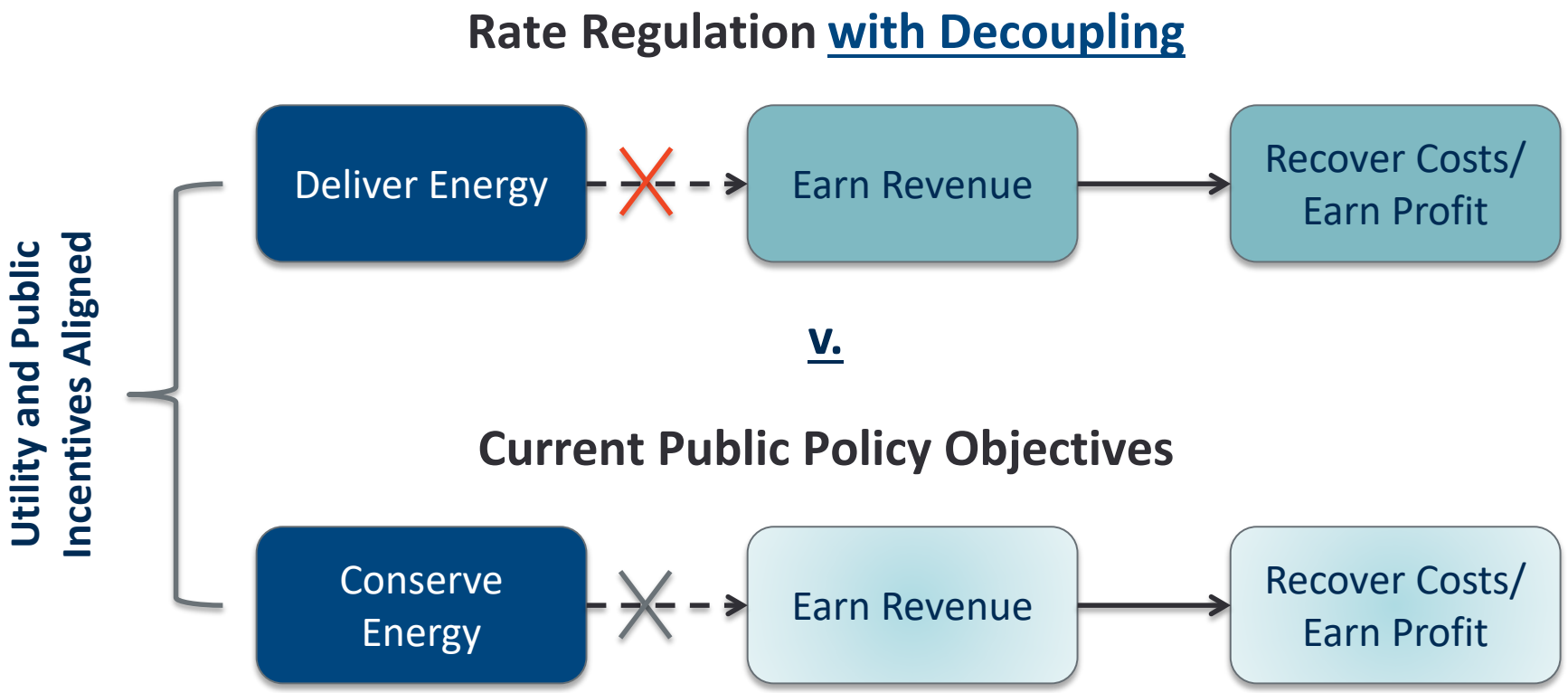
Traditional cost of service regulation encourages utilities to increase demand…



… which is in contrast with current public policy and energy conservation goals



Decoupling can remove the throughput incentive and help utilities manage growing volume risk



Public Service Electric & Gas – Gas Distribution (New Jersey)

Throughput Risks Covered	Risks of Delayed Recovery (Regulatory Lag)	Conservation Incentives for the Utility
✗ Decline in Usage per Customer ✗ Decline in Number of Customers ✓ Variability in Weather	Covers differences between forecast and actual weather impacts in future years	N/A

Limited Decoupling: weather normalization mechanism

- Traditional cost-of-service ratemaking, with base rates based on a historical test year
- Protection from weather variability, contingent on meeting capacity-reduction goals and earnings tests

Oklahoma Gas & Electric

Throughput Risks Covered	Risks of Delayed Recovery (Regulatory Lag)	Conservation Incentives for the Utility
✓ Targeted revenue loss from expected impact of policy goal	Differences between forecast and actual losses may or may not be trued up in future years	Specific

Limited Decoupling: variable peak pricing program and a lost revenue adjustment mechanism

- Traditional cost-of-service ratemaking, with base rates based on a historical test year
- Rider on customer's bill, calculated based on estimated recoverable kWh savings from utility energy efficiency and demand response programs
  - Trued up to account for actual (verified) savings
- Some protection from consumption trends and targeted revenue losses from policy programs

Arizona Public Service

Throughput Risks Covered	Risks of Delayed Recovery (Regulatory Lag)	Conservation Incentives for the Utility
✓ Targeted revenue loss from expected impact of policy goal	Differences between forecast and actual losses may or may not be trued up in future years	Specific

Limited Decoupling: two- and three-part rates offered to residential customers and a lost fixed cost revenue adjustment

- Traditional cost-of-service ratemaking, with base rates based on a historical test year
- Percentage charge applied to customer's total bill, calculated based on estimated recoverable kWh savings from utility energy efficiency programs and distributed generation
  - Trued up to account for actual (calculated) savings
- Some protection from consumption trends and targeted revenue losses from policy programs

Alberta Gas Distribution Utilities (Canada)

Throughput Risks Covered	Risks of Delayed Recovery (Regulatory Lag)	Conservation Incentives for the Utility
✓ Decline in Usage per Customer × Decline in Number of Customers ✓ Variability in Weather	Revenue requirement adjusted annually reflecting changes in costs/customers	Partial

Limited Decoupling: five-year rate plan; revenue-per-customer cap with weather normalization account

- Base revenues per customer increase with inflation, less a productivity offset
- Revenues are adjusted to reflect changes in the number of customers but not changes in use per customer
- Utility is protected from change in consumption per customer and weather variability, but not from change in number of customers

Pacific Gas & Electric (CA)

Throughput Risks Covered	Risks of Delayed Recovery (Regulatory Lag)	Conservation Incentives for the Utility
✓ Decline in Usage per Customer ✓ Decline in Number of Customers ✓ Variability in Weather	Covers differences between forecast and actual billing determinants in future years	Broad

Full Decoupling: 3-year multi-year rate plan with full true-up mechanism

- Base rates are set based on a combination of historical and forecast billing determinants for the first plan year
- Revenue requirement is escalated during plan term based on modeled parameters for various cost categories
- Annual reconciliation (true-up) of authorized revenues with non-weather-adjusted actual revenues

Ausgrid – Electricity Distribution (Australia)

Throughput Risks Covered	Risks of Delayed Recovery (Regulatory Lag)	Conservation Incentives for the Utility
✓ Decline in Usage per Customer ✓ Decline in Number of Customers ✓ Variability in Weather	Covers differences between forecast and actual billing determinants in future years	Broad

Full Decoupling: 5-year multi-year rate plan with full true-up mechanism

- Base revenues are set based on a multi-year forecast of O&M and tax costs, depreciation, and return, and rate base includes forecast capex; includes assumption on productivity improvement
- Authorized revenue is adjusted each year to match forecast
  - Rates are smoothed over plan term (equal, annual real-term increase or decrease)
- True-up ensures that revenues collected are equal to formula-determined amount

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