

Performance-Based Transmission Pricing: Alternatives and Incentives

ESD.126

Overview

- Transmission product definitions
- Performance based rates in FERC Order 2000
- Performance based ratemaking alternatives
 - Economic models
 - Incentives and benefits of each alternative
- Conclusions: Achieving both FERC and industry goals

Transmission Product Definition

- Differentiate between market-based and cost-based products
- Transmission access charges are cost based
- Transmission congestion charges
 - Traditionally have been managed under a command and control process
 - Moving to market based congestion management mechanism

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Transmission Product Definition

- Basic transmission products include
 - Firm, non-firm, ...
 - Monthly, daily, hourly...
 - Ancillary services
 - Transfer capability products may not be uniquely defined in a network
- Congestion
 - A product has economic value only when it is scarce

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Performance Based Rate Regulation

- The options for setting rates or prices are
 - Competitive markets
 - Government regulation
- Performance based regulation is a form of regulation that aims to capture market incentives in the regulatory structure

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Performance Based Rates and Efficiency

- Set rates related to competitive market prices
 - Ensures the efficient allocation of resources
- Base allowed rates on readily available data
 - Facilitates monitoring and enforcement
- Constrain the overall or average price, not prices of each individual service
 - Maintains the ability to reward utility innovation
- Base rates on factors beyond the influence of any one individual utility
 - Provides incentives for cost minimization

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Innovative Ratemaking in FERC Order No. 2000

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Performance Rates in FERC Order 2000

- Order 888 focus on comparable access & pricing
 - Level playing field for new and incumbent participants
- Order 2000 adds focus on operating transmission system to support regional markets
 - Expand the playing field for everyone
 - Requires increased transfer capability
- Dual objectives
 - Offer incentives for efficient expansion and operation
 - Remove existing disincentives to efficient expansion and operation

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Performance Rates in FERC Order 2000

- PBR is only one of the 8 transmission ratemaking topics discussed in Order 2000
 - FERC interest is in “innovative pricing” in general
- Economic benefits of PBR are to be shared by
 - Transmission owners
 - Transmission customers
 - Generation market participants
- PBR proposals can incorporate
 - Performance standards
 - Price/revenue caps
 - Price incentives

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Background: Policy Statement on PBR

5 standards from FERC’s 1992 Policy Statement on Incentive Regulation

- 1. Incentive ratemaking must be prospective**
- 2. Participation must be voluntary**
- 3. Incentive mechanisms must be understood by all parties**
- 4. Benefits to consumers must be quantifiable**
- 5. Quality of service must be maintained**

Order 2000 Focus on Markets

- 5 PBR principles to harness market forces
 - PBR must focus on all aspects of RTO operation, e.g. not cost without service quality or reliability
 - PBR should lead to efficient operating and investment decisions, and not compromise reliability
 - PBR include both rewards and penalties
 - Rewards and penalties should be known in advance, based on known and measurable benchmarks
 - Benefits of PBR shared between RTO and customers

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Performance Based Ratemaking

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Ratemaking Objectives

- General ratemaking objectives
 - Financial – revenue adequacy
 - Economic – capture market forces in the price
- Short run economic efficiency for
 - Energy markets
 - Capacity commitment (generation and transmission)
- Long run economically efficient signals for
 - Location of new generation
 - Investment in transmission

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PBR: Basic Arithmetic Relationship

$$\frac{p_1 q_0}{p_0 q_0} = \frac{FPI_1}{FPI_0} - X$$

where

- $p_1 q_0$ is the product price at time 1 times the quantity produced at time 0
- $p_0 q_0$ is the product price at time 0 times the quantity produced at time 0
- FPI_1/FPI_0 is the ratio of the increase in factor prices between time 0 and time 1
- X determines the sharing of benefits, between producers and consumers, from the increase in productivity.

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Alternative Types of PBR

- Price Cap
 - England-Wales RPI-X
- Upper/lower bound
 - Variable 'X'
- Static benchmarking
 - Define average performance value, or
 - Define performance envelope or frontier
- Dynamic benchmarking
 - Allow frontier to change over time

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Price Cap Regulation

- Price cap
 - Regulator sets maximum revenue per unit of service
 - Price cap changes with time based on the increase in factor prices less a factor for increased productivity:
 $(FPI_1/FPI_0) - X$
- Common indices used for (FPI_1/FPI_0)
 - Retail price index: RPI
 - Producer/consumer price index
- 'X' factor
 - Estimated for sharing the productivity gains between the transmission provider and customers
 - Subjective, set via negotiation and debate

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Price Cap Regulation – Benefits

- **Simplicity: Regulators**
 - Use retail/wholesale, consumer/producer price indices
 - ‘X’ value remains set for many years
 - Light-handed regulation – rate reviews are evenly spaced and infrequent
- **Transmission provider**
 - Provides clear target for improvements and time frame within which to achieve them
- **Transmission customer**
 - Known and easily forecasted rates for specified periods

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Price Cap Regulation – Drawbacks

- Setting initial baseline for price cap is complex, contentious and difficult to adjust later
- Incorrectly determining ‘X’ can degrade incentives
 - Too high may discourage investment by transmission provider
 - Too low may inflate the cost of getting energy to the market, and so impede wholesale power market development and future investment in generation

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Price Cap Regulation - Variations

- Standard RPI-X
 - The index is based on the individual firm's prices for the different products offered
 - See Jaffe and Kahn reading
- Yardstick regulation
 - Industry average costs used for index
 - Use other firms' prices for an external reference rate level
 - Forced to compete with each other regardless of whether they actually compete in the same product markets

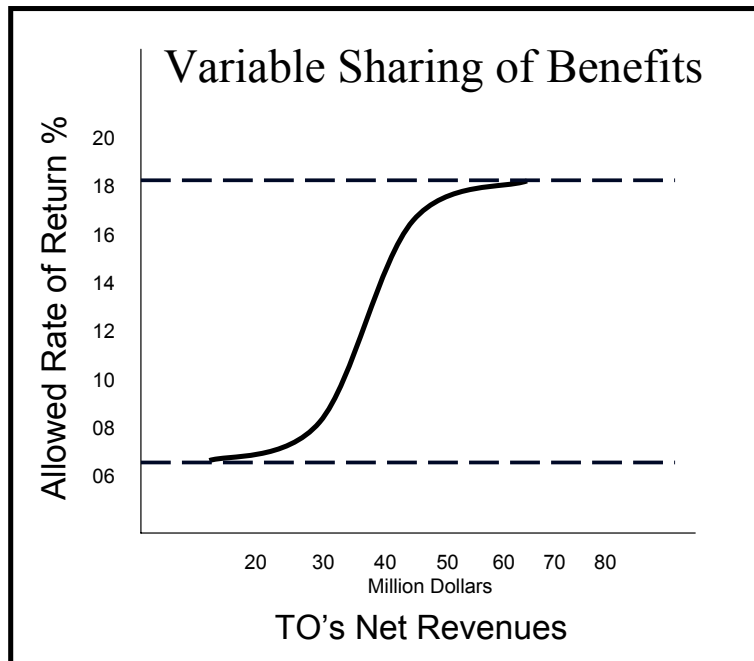
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Upper/Lower Bound

- A variant of price cap regulation
- Allowed rate of return is bounded by upper and lower limits
- 'X' is not fixed – gains from improved productivity are shared proportional to the level of productivity improvement
- Implementation – one option is the 'S' or logistic curve (next slide)

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Upper / Lower Bound



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Upper/Lower Bound – Benefits

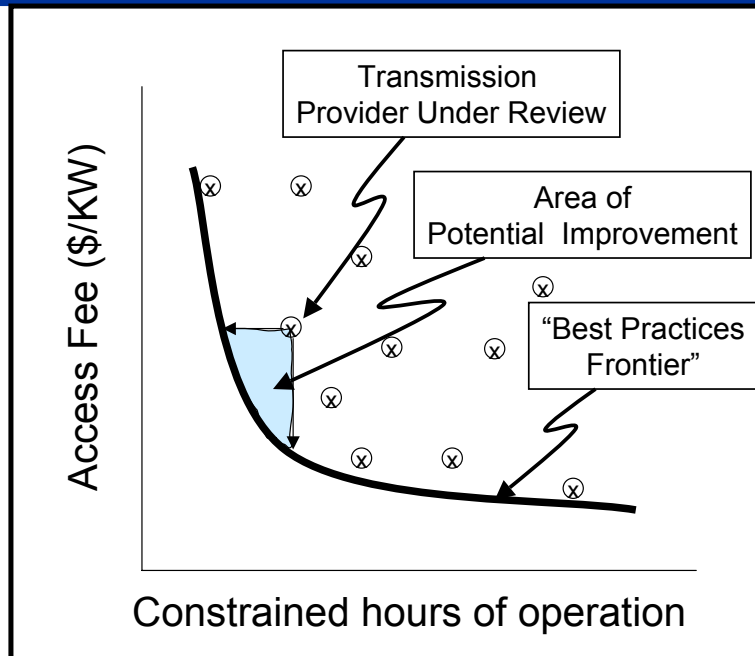
- Improved incentives – benefits to operator increase with improved operational efficiency
- Light-handed regulation once initial conditions are set
- Flexible – easier for regulator to work within a range (upper and lower bounds) than to set a single value
- Drawbacks – same as for Price Cap

Static Benchmarking

- Concept – Evaluate individual performance by comparing the performance of all providers
- Objective – Define an ‘envelope’ that bounds the performance of all providers (see next slide)
- The frontier
 - Reflects the best possible performance for measured performance attributes
 - Provides information to regulators and providers on the trade-off between the attributes

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Static Benchmarking: Two Attribute “Best Practices” Frontier



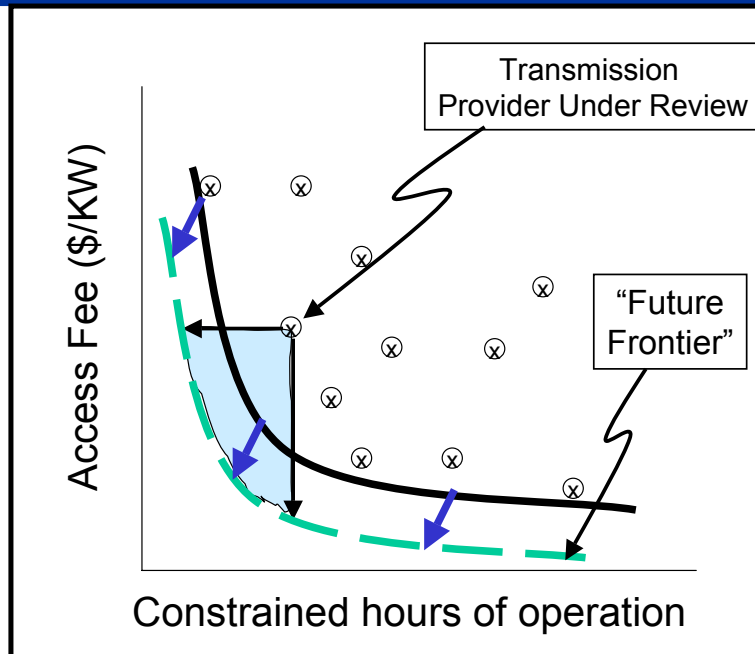
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Dynamic Benchmarking

- Acknowledges the productivity index, or “best practices frontier,” will improve and shift with changes in technology

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Dynamic Benchmarking: Two Attribute “Best Practices” Frontier



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Benchmarking – Benefits

- Provides information on individual elements of productivity improvement
 - Regulators can monitor performance more directly
 - Providers know specifically what needs improvement
 - All participants can see the trade-offs

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Benchmarking – Drawbacks

- Difficult to create a realistic and comparable sample of transmission providers, in order to obtain the “best practices frontier”
- Dynamic – difficult to estimate the rate of improvement in performance attributes for the “future frontier”
- Increased data reporting burden on transmission providers
- Increased data analysis burden on regulators

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Comparison of PBR Incentives

- Transmission operating costs
 - PBR gives incentives to minimize operating costs, especially at the front end of each review period, to capture benefits early
 - Bounds: as reach upper bound, may have incentive to over-invest to maximize net revenues
 - Benchmarking: may have perverse incentive to optimize one attribute at expense of others (not as strong with dynamic form)

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Comparison of PBR Incentives

- Transmission expansion and connection
 - Incentives depend on which parameter is used as the measured service unit, i.e. kW or kWh
 - kWh basis provides incentive to maximize throughput, improve TTC and ATC
 - kW basis provide incentive to connect kW (trade-off with responsibility for congestion from increased trade)

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Comparison of PBR Incentives

- Transmission congestion
 - Price cap: If the transmission provider is responsible for both congestion and investment, the incentive is to minimize total cost
 - Bounds: Little incentive to minimize congestion – incentive is on return on investment
 - Benchmark: Strong incentive to minimize congestion, if congestion is a monitored attribute
- Ancillary services
 - Minimize the cost of marketable services in order to compete with other providers

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Summary: Possible Performance Measures

- Operating efficiency, production costs
- System reliability
- Congestion management
- Balancing markets
- Efficient investment
- Innovation (e.g. use of new technologies (FACTS))

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Summary: PBR Benefits

- Provide incentives to operators to improve operating efficiency
 - Congestion management
 - Transfer capability, TTC and ATC calculation
- Provide incentives for efficient investment
 - Incentives to invest in new technologies-FACTS
 - Incentives to invest in R&D – real-time monitoring
- Provide means to share productivity savings between producers and consumers

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Summary: FERC Objectives

- Introduce market forces while preventing monopolist abuse – regulate but bring in market incentives
- Ensure customers have access to non-discriminatory service at just and reasonable rates
- Ensure that transmission owners have the opportunity to earn a reasonable rate of return

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Summary: Implementing PBR

- Difficult to initiate the process
 - Determine capital asset base
 - Calculate ‘X’ or ‘best practices frontier’
- PBR and incentive rate structures require
 - Clearly defined products and services
 - Clearly defined property rights
- PBR can be an effective tool for light-handed regulation of transmission service

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Conclusions

- Transmission pricing and RTOs at FERC
 - FERC is seeking innovative proposals from industry and encourages regional differences
 - Focused on the collaborative RTO process
 - Self-defined role of *facilitator* not initiator
- The benchmarking PBR options are consistent with FERC desire for a collaborative process
 - Identification of individual attributes facilitates discussion
 - Options along frontier provide flexibility

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Conclusions

- Companies must initiate the process, and request that FERC grant performance based ratemaking
 - ComEd and Alliant ITC/MISO proposal
- Pricing proposals must explain
 - Consistency with Order 2000
 - How proposal will facilitate all markets (see earlier quote)
 - Meet the 5 PBR principles stated in O2k
 - Implementation process
 - Monitoring, data requirements