

Advanced Workshop in Regulation and Competition

24th Annual Western Conference

Portola Hotel & Spa, in Monterey, California, on June 15-17, 2011

The Conference features some of the latest developments in the network industries, especially energy, including:

- Deregulation
- Market Structure
- Policy and Regulatory Issues
- Environmental Policy and GHG
- Telecommunications and Water
- Pricing and Demand Response
- Capacity and Reliability

Who should attend:

- Industry Economists, Consultants and Attorneys
- Marketing and Regulatory Managers
- Regulatory Commission Staff

**Featured Speaker: Commissioner William E. Kovacic,
U.S. Federal Trade Commission**

**Dinner Speaker: V. John White, Executive Director,
CEERT**

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The *Center for Research in Regulated Industries*, located at Rutgers University, aims to further study of regulation in economics, finance, and institutions. Its publications, seminars, workshop, and courses make available the latest advances to academics, managers, and regulatory commission staff. The Center has over thirty years of experience providing research, instruction, conferences, courses, seminars, and workshops in economics of network industries. The Center's *Journal of Regulatory Economics* is an international scholarly bi-monthly publication intended to provide a forum for the highest quality research in regulatory economics. Other research from the Center's programs has been published in the book series *Topics in Regulatory Economics and Policy*.

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WEDNESDAY, JUNE 15, 2011

2:00 - 4:00	Registration	<i>Elevator Foyer</i>
4:00 - 6:00	Welcome to Conference: Michael A. Crew James Cooper & William Kovacic: Behavioral Economics: Implications for Regulatory Agency Behavior Sandra S. Bennett: Transmission Cost Recovery – A Collision of State and Federal Oversight	<i>Bonsai I & II</i>
6:00 - 7:00	Cocktail Hour	<i>Portola Room</i>
7:00 – 9:00	Dinner & Keynote Speech: V. John White, Executive Director, CEERT	<i>Portola Room</i>
9:00 – 10:00	Reception	<i>Portola Room</i>

THURSDAY, JUNE 16, 2011

8:00 - 9:40	<i>Concurrent Sessions</i>	
	BROADBAND Chair: Julie C. Kelly Discussants: Carl Danner & Jiong Gong Victor Glass: Proposal for Achieving an Efficient Universally Available National Broadband Network Based on the Comparability Standard Menahem Spiegel: Cost of Provision, Pricing and Internet Neutrality Glenn A. Woroeh & Armando Levy: Diffusion with Dueling Platforms: Technology Spillovers in the Cable-Telco Broadband Race	<i>Bonsai I</i>
	CUSTOMER RESPONSE Chair: Mark S. Martinez Discussants: Andy Satchwell Eric Bell & Richard Song: Small Business Customer Response to Seasonally Differentiated Electricity Rates Curtis Roe, S. Chhaya & Robert Entriken: Premises Energy Management Simulation Platform Ahmad Faruqui, Sanem Sergici & Lamine Akaba: Impact Evaluation of Consumers Energy's Experiment with Dynamic Pricing	<i>Bonsai II</i>
9:40 – 10:00	Coffee Break	<i>Bonsai Foyer</i>
10:00 - 11:40	<i>Concurrent Sessions</i>	
	RENEWABLES I Chair: Kari Klobberdanz Discussants: Nguyen Quan Matthew Arenchild: Analyzing State RPS Provisions and Lessons from PURPA's Implementation Jim Heidell & Michael King: Renewable Resource Acquisition and the Cost of Early Adopters Karen Shea: Interconnection for Renewables: Lessons/Challenges from the Ground Floor	<i>Bonsai I</i>
	REGULATORY ISSUES Chair: Ray Williams Discussants: Carl Silsbee Michael A. Crew & Paul R. Kleindorfer: The Contribution of the Journal of Regulatory Economics Armando Levy & Lisa Cameron: Pole Attachment Economics: A Shapley Value Approach Amber Mahone, James Williams & Snuller Price: Long-term Greenhouse Gas Reductions and Electricity Generation in California	<i>Bonsai II</i>
11:40 - 1:00	Lunch Break	
1:00 - 2:30	<i>Concurrent Sessions</i>	
	RENEWABLES II Chair: Udi Helman Discussants: Phil Auclair & Carl Danner Jeffrey Nelson & Paul Nelson: Integrating Variable Energy Resources while Maintaining Reliability: The Role of Integrating Services and the Importance of Proper Cost Allocation Eric Woychik, Hua Fang & Mark Martinez: Reality-Based Benefit-Cost Assessment of Demand Side Management Integration: Methods to Maximize Market Capture in Organized Markets Robert Entriken & Taiyou Yong: Technique for Reserve Determination with Consideration for Conventional and Emerging Technologies: Enhancement of Stochastic Optimal Power Flow	<i>Bonsai I</i>
	WATER Chair: Bob Kelly Discussants: Jason K. Hansen & Albert Schiff Roger Buckland: Risk, Volatility and Regulation in Water Supply and Distribution Robert Earle: Using Markets to Regulate Nutrient Water Pollution Rami Kahlon: Water Action Plan – The New New Plan for California Water Utilities	<i>Bonsai II</i>

2:30 - 4:00 *Concurrent Sessions*

ELECTRIC VEHICLES

Bonsai I

Chair: Marcus Alexander

Discussants: Janos Kakuk & Richard Tabors

Richard Aslin & Jeffrey Swanson: Electric Vehicles Penetration Study Using Linear Discriminant Analysis

Tim Mount, Max Zhang, Wooyoung Jeon & Alberto

Lamadrid: The Potential Benefits for Electricity

Customers from Controllable Loads

Nicole Taheri and Robert Entriken: Providing Grid

Services with a Fleet of Plug-in Electric Vehicles

CAPITAL INVESTMENTS

Bonsai II

Chair: Mike King

Discussants: Kevin S. Bassler & Robert K. Brown

Fred Curry: Valuing Delayed Capital Investments

Paul T. Hunt: Purchased Power Contracts and Regulated Utility Cost of Capital

Karl A. McDermott: The Determinants of Electric Utility

Capital Structure: Re-examining the Turbulent 1980s

FRIDAY, JUNE 17, 2011

8:45 - 10:40 *Concurrent Sessions*

REGULATORY PROCESS

Bonsai I

Chair: Peter Liu

Discussants: Stephen St. Marie

Ashley Everette & Karl McDermott: The Determinants of Commission Total Revenue Decisions: A Case Study of Illinois Energy Utilities

Alan Finder: Preparing for a Reformulated Regulatory Process

Jan Reid: Contemporary Evidence from California: Who Gains when Evidentiary Hearings are Held?

TRANSMISSION PLANNING

Bonsai II

Chair: Rami Kahlon

Discussants: David Miller & Kevin Woodruff

Navin Bhatt, B. Barker & Robert Entriken: New Transmission Planning Framework

Robert Earle & Ryan Maddux: Competition in Transmission Construction – Is it working?

Jeffrey McDonald: Congestion Costs and Transmission Expansion

10:40 – 11:00 Coffee Break

Bonsai Foyer

11:00 - 12:55 *Concurrent Sessions*

CONSERVATION RATES

Bonsai I

Chair: Frank Harris

Discussants: Michael Alexander & Russell Garwacki

Ahmad Faruqui, Doug Mitarotonda & Ryan Hledik: The Economics of Inclining Block Rates

Dennis M. Keane: PG&E's Inclining Block Electric Rates for Residential Customers: Toward a More Equitable Rate Design

Scott Murtishaw: Reconsidering Residential Rate Structures in California

RESOURCE ADEQUACY

Bonsai II

Chair: Eric Woychik

Discussants: Udi Helman & Kevin Woodruff

Carl B. Linvill, Richard McCann & David Groves: Analyzing California's Resource Adequacy across Many Features

Gary Stern & Nicole Neeman Brady: Getting Needed New Generation Built When Not Needed for Planning Reserve Margin Requirements

SPEAKERS DISCUSSANTS & CHAIRS

- Marcus Alexander**, Electric Power Research Institute
Michael Alexander, Managing of Energy Projects, Southern California Edison
Matthew Arenchild, Director, Navigant Consulting, Inc.
Richard Aslin, Manager - Economics, Forecasting and Rate Data Analysis, Pacific Gas & Electric
Phil Auclair, Consultant, Energy Policy & Economics
Kevin S. Bassler, Senior Financial Analyst, Southern Company Services, Inc.
Eric Bell, Project Manager, Business, Regulatory & Consumer Affairs, Southern California Edison Company
Sandra Bennett, Vice President, Regulatory & Finance, Southwestern Electric Power Company
Robert K. Brown, Analyst, Regulatory Affairs, Portland General Electric
Roger Buckland, Professor, University of Aberdeen
Michael A. Crew, CRRRI Professor of Regulatory Economics, Rutgers University and Director - CRRRI
Fred Curry, Regulatory Consultant
Carl Danner, Director, Berkeley Research Group, LLC
Robert L. Earle, Vice President, Analysis Group
Robert Entriken, Senior Manager, Policy Analysis, EPRI
Ashley Everette, Graduate Student, University of Illinois - Springfield
Ahmad Faruqi, Principal, The Brattle Group
Alan Finder, Global Regulatory Advisors
Russell Garwacki, Manager – Pricing Design & Research, SCE Regulatory Policy & Affairs
Victor Glass, Director of Demand Forecasting and Rate Development, National Exchange Carrier Association, Inc.
Jiong Gong, Associate Professor, University of International Business and Economics
Jason K. Hansen, Assistant Professor of Economics, Naval Postgraduate School
Frank Harris, Financial Analyst, Southern California Edison
Jim Heidell, Vice President, NERA Economic Consulting
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Paul T. Hunt, Director of Regulatory Finance and Economics, Southern California Edison Company
Rami Kahlon, Director of Water Division, California Public Utilities Commission
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Karen Shea, Project Manager – Transmission & Distribution, Southern California Edison
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Richard Song, Marketing Analyst, Tariff Programs & Services, Southern California Edison
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Richard Tabors, Vice President, Charles River Associates
Nicole Taheri, Stanford University
V. John White, Executive Director, CEERT
Ray D. Williams, Director, Long-term Energy Policy, Pacific Gas & Electric
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24th ANNUAL WESTERN CONFERENCE

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HOTEL RESERVATIONS

Sufficient Rooms are reserved at the Portola Hotel & Spa for all of the Conference participants. Participants should register for the conference by returning registration forms to Portola Hotel & Spa. Reservations should be received by **May 17, 2011**. Hotel reservation can be made by using the following Passkey Link:

<https://resweb.passkey.com/go/CRRI2011>

Portola Hotel & Spa

Two Portola Plaza
Monterey, California, 93940, USA

Please identify yourself as being held under the group block:

Rutgers University CRRI Program.

REGISTRATION INFORMATION

To Register: Please complete and return the form to CRRI. Registrations are accepted by mail, email, fax, and telephone. Please confirm telephone registrations by sending in a completed and signed registration form. The deadline for registrations is May 2, 2011. Registrations received after May 2, 2011 will be admitted on a space available basis.

Volume discount: Second and subsequent applications received in the same envelope, fax, email, or made at the same time by phone will receive a 5% volume discount.

Payment Information: Make checks payable to "Rutgers University" and mail to the attention of at the above address. Fees include prescribed learning materials, dinner on Wednesday night, June 15, 2011, all receptions and coffee breaks, but do not include lodging and other meals. The government registration fee is available for government employees.

REGISTRATION FORM: 24th Annual Western Conference

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CANCELLATION POLICY: Until May 2, 2010 cancellation is allowed without penalty and refunds will be allowed in full. After this date, the indicated fee is due in full whether or not the participant actually attends. Substitutions may be made at any time.

Signature of Participant: _____

Transmission Cost Recovery – A Collision of State and Federal Oversight

Prepared by: Sandra S. Bennett
Vice President Regulatory & Finance, AEP-Southwestern Electric Power Co.
Southwest Power Pool Finance Committee Member, representing Transmission
Owners

Since FERC Orders No. 888 and 890 unbundled the transmission functions and pricing, the dilemma of “who pays what” has continued to vex the once-vertically integrated utilities. Partially as a result of multi-state jurisdictional requirements, many utilities or holding companies have established “Independent Transmission Companies” who only build and operate transmission facilities, and require only a FERC Open Access Transmission Tariff (OATT) to collect their funds. This attempt to simplify transmission construction often backfired for the utilities as state commissions saw the independent transmission companies simply as a vehicle to arbitrage the return on equity. The predicament remains at the state level: how does the native utility collect all transmission costs from their retail customers? And what oversight and powers remain at the state level for retail collection of transmission costs?

Problems faced by utilities today include multi-state jurisdictions for retail rates within an RTO, with each state having its own requirements to establish “need” and to allow retail rate recovery. A multi-state utility can get caught between the cracks of state jurisdictional ratemaking, and recover only a portion of the total RTO-billed transmission costs. Some states have instituted retail transmission “pass-through” rate mechanisms, while others continue to allow transmission recovery only in the traditional rate base/base rate recovery. Utilities may be billed at one rate by the RTO, yet allowed recovery on a different basis by the state commission(s).

Further, in most cases, the native utilities also have a FERC-approved OATT as required for their RTO participation. These tariffs generally include an ROE component that is higher than the state approved equivalent, if only for the 50 basis point adder awarded by FERC for participation in an RTO. Each state commission has to determine if and how it will allow retail recovery of the RTO tariff, which may include the native utility’s higher FERC-approved ROE. Many commissions are just now addressing this conundrum, and the reluctance at a state level to give “a higher ROE for doing nothing different” is growing.

Additionally, the RTO approval and oversight of regional transmission projects is increasingly coming under state scrutiny. Although the approval of a project by an RTO allows recovery for the “building” utility from other RTO participants, there is no assurance of recovery at a retail level of costs that a state may deem inappropriate or not controlled.

As examples, in November 2010, Chairman Jeff Davis of the Missouri Public Service Commission opened a docket requesting a detailed review of cost overruns on SPP Projects. Chairman Smitherman of the Public Utility Commission of Texas has also requested that a rulemaking be opened in Texas to address SPP project cost overruns as well as the “novation” of transmission projects from the native utilities to third-party FERC-only transmission companies, and his notion of potential arbitrage of FERC vs. State Returns on Equity by utilities and their affiliates.

In June 2010, the FERC issued a Notice of Proposed Rulemaking (NOPR) that is intended to modify Order 890 establishing transmission planning and cost allocation requirements for the “unbundled” world of FERC Order 888. The NOPR (RM-10-23) has drawn the attention of State Commissions, Transmission owners, and RTOs, who seek to make sure that the FERC does not overstep its Federal role in areas traditionally under state authority. It is hoped that the rulemaking will clarify some of issues discussed above in cost allocation, cost control, and cost recovery.

This presentation will explore these issues in detail, presenting the views of the utility, the Commissions and the RTOs.

Paper : “Behavioral Economics: Implications for Regulatory Agency Behavior”

Authors

James Cooper, Attorney Advisor to Commissioner William Kovacic, US Federal Trade Commission

William Kovacic, Commissioner, US Federal Trade Commission

Contact and Paper Presenter

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Abstract

An important focus of modern scholarship in law and economics is the extent to which the actual behavior of individuals confounds expectations of models that assume an important degree of rationality in decision making. One central theme of this literature is that individuals, owing to a variety of phenomena (e.g., emotion, psychological conditioning, incapacity to analyze large bodies of information) often fail to make choices that serve their best interests.

The modern behavioral economics literature has important implications for many forms of economic regulation. It suggests that the range of appropriate government intervention is considerably greater than the status quo. In particular, it calls into doubt the capacity of individual choice and market processes to provide consumers with an optimal range of goods and services. It suggests, instead, that regulatory bodies ought to play a more powerful role in determining what products ought to be available for consumers, in setting the terms on which these products are supplied, and in guiding the choices that consumers make among an array of product offerings.

Those who see the behavioral economics literature as justifying a more expansive form of regulatory state often make the explicit or implicit assumption that public regulatory bodies will make sensible choices among a range of policy options. This paper considers how the same forces that are said to shape the behavior of individual consumers might also affect the performance of public regulatory agencies. It examines how the apparent “irrationalities” observed in the conduct of individuals as consumers might also appear in the choices of individuals acting as regulators. In doing so, it raises cautions about accepting an assumption that public regulatory authorities are ordinarily likely to be proficient in setting default terms that better serve the interests of individual consumers.

Proposal for Achieving an Efficient Universally Available National Broadband Network Based on the Comparability Standard

By Victor Glass

ABSTRACT

The challenge facing policymakers is to develop effective policies combining the best of private and public initiatives to achieve universal broadband availability, high adoption rates, and efficient and sustainable investment in infrastructure.

The purpose of this paper is to offer a strategy for achieving these goals that is grounded in economic theory and consistent with the 1996 Act's comparability standard for setting prices, whereby rural prices and services should be similar to those in urban areas.

The proposal also deals with setting Universal Service Funding (USF) requirements and with developing a USF assessments strategy. Unlike previous proposals that look at fair ways to raise funds such as charging per connection to the broadband network or charging premiums for higher capacity connections, this proposal focuses on using universal service assessments to reduce negative spillovers and increase positive spillovers across networks that constitute the nation's broadband network.

Cost of Provision, Pricing and Internet Neutrality

By

Menahem Spiegel

CRRRI and the Department of Finance and Economics
Rutgers Business School Newark and New Brunswick

November 2010

ABSTRACT

The internet today is a provider of transportation services to the creators of contents (for simplicity, owners of websites'). From the point of view of welfare economics, to maintain a complete Internet Neutrality, the internet transportation services needs to be provided at no charge to all users and the cost of provision (fixed and variable) needs to be covered from general funds raised in the form of "lump sum" taxes. The current use of the term "Internet Neutrality" is to describe one aspect of the service provision. That is, no differentiated charges (or other constraints) should be imposed on the different users of the network, consumers as well providers of contents.

Currently, most of the income source to the providers of the network infrastructure is from consumers of the internet contents and not from the producers of content. For several reasons the providers of the internet infrastructure services would like to see this situation changed.

Once the Internet Neutrality (even the limited) is violated, there will be a greater room for a successful call for more direct intervention and regulation of this communication mode. The main objective of this paper is to explicitly introduce different models of pricing of internet services and measure their effect on the total economic welfare resulting from the internet.

Prof GLENN A WOROCH
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Abstract

Diffusion with Dueling Platforms: Technology Spillovers in the Cable-Telco Broadband Race

In most developed economies, broadband penetration amounts to the spread of digital subscriber line (DSL) and cable modem (CM) services, and each of the two technologies has typically been offered in each region by a single telephone and cable company, respectively. Aside from differences in pricing, quality and service provided by the dominant provider, take-up rates for each technology may depend on the combined broadband population in addition to the subscriber base of each carrier. Our focus in this study is on market and regulatory determinants of intra- and inter-platform diffusion. Positive cross-platform spillovers may arise when existing users communicate the benefits of broadband access to prospective subscribers of either technology. Negative spillovers occur when a subscriber, dissatisfied with their service, switch to a competitor, or forgo broadband altogether.

We model diffusion of broadband as a blend of intra-platform growth governed by standard epidemic diffusion and an inter-platform process that allows for positive or negative cross-platform spillovers between telcos and cablecos. Both effects are captured by a system of differential equations that we solve for a pair of diffusion equations. Those equations depend on own- and cross-platform parameters which we estimate using regression. The estimation uses quarterly penetration for DSL and CM in 17 developed countries over a 10-year period, 1Q98-3Q08. The data provided by Point Topic[®] are unique in that they include the number of subscriber lines for each technology at the carrier level, as well as carrier-specific monthly subscription fees and advertised download speeds.

Preliminary estimation results at the country level reveal a pattern across countries indicating strong intra-platform installed base effects for each technology but weak inter-platform spillovers between DSL and CM penetration. Estimation results for the full sample of countries are inconclusive, suggesting that for that reason we Preliminary estimation results weakly confirm two-platform diffusion model with the usual intra-platform feedback effects. However, we also find an asymmetry between the two broadband technologies with DSL adoption promoting CM adoption, but not vice versa. The estimation results lead us to look at country-specific factors to understand broadband diffusion. For that reason we introduce indicators of regulatory policies that affect broadband deployment including unbundling/sharing rules and network build-out requirements.

Our diffusion model has immediate implications for the design of policies aimed at promoting inter-platform competition as a means to achieve greater broadband penetration. In particular, we consider the benefits that derive from promotion of 3G/4G broadband wireless services, as well as tradeoffs that arise from asymmetric regulatory treatment of the DSL and CM platforms.

Topic: Small business customer response to seasonally differentiated electricity rates.

Authors: Eric Bell, Business, Regulatory & Consumer Affairs, Southern California Edison Company
Richard Song, Tariff Programs & Services, Southern California Edison Company

Contact Information: 626-302-1822, eric.bell@sce.com
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Paper Abstract:

On October 1, 2009, approximately 460,000 small business customers transitioned to seasonally differentiated rates. The variable cost component of the tariff shifted from a flat, year-round rate to a revenue-neutral seasonal rate with summer season pricing approximately 38% higher than the rate for the remainder of the year. The new pricing structure is reflective of patterns of demand and higher marginal costs of generation and distribution of power in summer months.

This study estimates changes in customer energy consumption (kWh) patterns resulting from the seasonally differentiated pricing structure. Econometric analysis leverages panel data across the entire population of affected customers, from 2005 through the present. Observations include: monthly energy usage (kWh), relevant customer segmentations, local daily temperature, energy price, energy efficiency program influence, customer communications, and region-specific economic conditions, among other variables.

The study identifies the determinants of responsiveness to seasonal price differentiation. In addition, estimated energy consumption changes occurring during the 2010 summer season are reported for the average customer and in aggregate grouped by relevant customer segments, climate zone, and total customer base.

This paper describes a platform for simulating Premise Energy Management (PEM) systems, which are amalgamations of hardware and software providing energy management in any setting with controllable loads, like an office building. Such energy management provides an interface between multiple controllable loads and two external actors: the premise manager and the utility provider. The function of the PEM system is twofold: to provide energy usage information to the home owner and to provide added controllability of electric appliances. This controllability can extend via the premise manager to the utility (under suitable contractual obligations).

**IMPACT EVALUATION OF CONSUMERS ENERGY'S
EXPERIMENT WITH DYNAMIC PRICING**

(Abstract)

Ahmad Faruqui, Sanem Sergici, and Lamine Akaba
The Brattle Group

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Consumers Energy, located in Michigan, undertook a dynamic pricing pilot (“Personal Power Plan” or PPP) in the summer of 2010 and tested customers’ responsiveness to several dynamic pricing, technology and information treatments. The results were expected to feed into its business case for investing in advanced metering infrastructure.

The PPP tested critical peak pricing (CPP), critical peak rebate (CPR), and information-only treatments on 600 customers with and without an intelligent communicating thermostat (ICT) technology. The pilot design also included two control groups, in contrast to other pilots that have only included a single group. One of the control groups was not aware they were in a pilot and provided a representation of the “but-for” usage levels for the treatment customers. The other control group was informed of the pilot program and was recruited to investigate any potential “Hawthorne bias” that could arise when human subjects in an experiment change their behavior simply because they are cognizant of being observed.

In this paper, we estimate the demand functions that correspond to the constant elasticity of substitution (CES) utility function. We use this demand system and implied substitution and daily price elasticities to solve for the demand response of Consumers Energy customers to dynamic pricing and technology treatments. Our analysis of the information treatments involves the use of an ANCOVA model.

We found that the substitution elasticities for CPP, CPR and CPP + ICT customers were not statistically distinguishable from each other. We also found that the information treatments which involved day-ahead notification of the critical peak event days led to significant peak demand reductions. These results enrich our understanding of customer behavior and expand the insights that have been derived from earlier pilots, some of which have been discussed in prior CRRI conferences on the two coasts. For example, in the Baltimore pilot, the CPP and CPR customers displayed similar elasticities. However, that result was not observed in the Connecticut and District of Columbia pilots.

Analyzing State RPS Provisions and Lessons from PURPA's Implementation

A majority of states have established Renewable Portfolio Standards (RPS) and there are proposals for Congress to legislate a federal RPS. States that have implemented RPS have chosen a wide variety of program designs and they have largely been constructed without reference to a federal program. A significant amount of analysis has been done to categorize the different provisions in each state program, such as allowed contract duration, procurement process and the treatment of Renewable Energy Credits.

This paper will focus on the role of the state regulator in facilitating contracting between project developers and the electric suppliers who are subject to the RPS. The analysis will discuss how specific provisions in each state's RPS can allow the programs to meet the goals of each state's regulators, applying concepts from public choice economics. In addition, the current situation with RPS has a number of similarities to the Public Utilities Regulatory Policies Act (PURPA), which was also implemented on a state-by-state basis subject to federal legislation. Therefore, the paper will also review how contract terms and provisions impacted PURPA's implementation and apply the concepts to implementing RPS.

Renewable Resource Acquisition and the Cost to Early Adopters
Jim Heidell and Mike King
NERA Economic Consulting

Aggressive renewable portfolio standards in some states are driving electric utilities to rapidly acquire renewable resources. Renewable generation projects, however, will likely raise the cost of supplying power to customers, and differing renewable technologies have differing cost characteristics. In fact, many of the most expensive technologies, such as solar thermal, photovoltaic generation, and off-shore wind are expected to decrease rapidly in cost as adoption drives learning and enables economies of scale. Relatively mature renewable resources such as geothermal, on-shore wind, and biomass may not have significant technology driven declining costs, but still have temporal acquisition cost issues. The mix of renewable resources procured by utilities is driven by a number of factors including regional availability, access to transmission, set-aside mandates, and diversification objectives.

Typically, the utility has limited flexibility in its renewable procurement plans as a result of potential penalties if its procurement does not meet the mandates in the enabling RPS legislation, mandates by its regulatory commission, and agreements made as a result of other regulatory settlement agreements. At the same time, the procurement of renewable resources to meet mandates is far from riskless. Utilities face potential political backlash if the costs are too high, there are environment policy changes, or there are performance issues. Despite the constraints, there is some flexibility in renewable resource procurement and this leads to the questions of what is the optimal strategy for procuring renewables and what is the optimal mix of resources?

This paper examines why renewable resource selection using typical utility integrated resource planning tools will not necessarily capture the all potential costs and risks in renewable procurement and postulates a decision-analysis framework for identifying dominant procurement strategies.

A number of caveats will apply to any results developed. Primarily, the analyses will yield only results to date and not the life-cycle and other long-term results that should be the primary bases ultimately for public policy. On the other hand, by examining the degree to which results to date have met expectations, the analysis will help develop updated life-cycle and long-term estimates that are improved from those made at the outset based on projections and not leavened with much actual local experience. Also, because cost-effectiveness must properly be estimated on an *ex ante* basis using the best information available at the time decisions must be made and *ex post* results often reflect merely how uncertainties turned out in the event, while *ex post* results may provide bases for improving future *ex ante* estimates, they do not necessarily show any error or flaw in the *ex ante* assessments. Further, findings may be specific to Nevada and certain policies and projects, and not generalize to other states, policies or projects. All results, findings and conclusions will, of course, be noted as the responsibility of the author, not attributable to the PUCN or its Staff. And they will be appropriately qualified based on the extent, robustness and gaps in the data available.

Pole Attachment Economics: A Shapley Value Approach

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Lisa Cameron
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Presented by: Armando Levy

Abstract

In this paper we examine the economics of utility pole attachments. Although, an important business issue, few economists have investigated the issue in a formal fashion. The few papers we have seen use Ramsey pricing as the basic framework, but as we will argue, this is most likely the wrong framework. Instead we propose a solution from axiomatic cooperative game theory. It is analogous to the famous application of the Shapley Value to determination of airport landing fees (Littlechild and Owen(1973), Littlechild and Thompson(1977), Dubey(1982).) This simple solution will be extended to situations where entry times differ, where utilities are forced to contemplate sharing in the future, where there seem to be externalities, such as risk of line failure. Examples of such risk include problems that would arise if a cable company's line broke, shorted out the power lines above it and causes a fire for which the power company becomes responsible, either by dint of lawsuits or by dint of needing to carry increased insurance.

Long-term Greenhouse Gas Reductions and Electricity Generation in California

Submission to 24th Annual Western Conference: CRRI's Advanced Workshop in Regulation and Competition

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Abstract

Electricity supply choices at the state and utility level are increasingly shaped by concerns about future climate change regulations. In 2009 a large Southern utility, Progress Energy, announced plans to shut down 11 coal-fired power plants due to concerns about the future cost of emissions controls.¹ While it is clear that existing coal-fired power plant emissions must be mitigated to reduce greenhouse gas (GHG) emissions in the electric sector, it is still unclear what the ideal future electricity generation mix should look like in a GHG constrained world. In April 2009, the Federal Electricity Regulatory Commission (FERC) Chairman John Wellinghoff suggested that future generation needs will be met exclusively by renewables, and that “baseload capacity is going to become an anachronism” in a world of distributed generation and the “smart grid.”²

In order to investigate the feasibility of different generation mixes in a low-carbon future, and to consider the future needs for baseload power, peaking capacity and load-following resources, we undertook a study of California's GHG emissions trajectory through 2050. We focus on what it would take to achieve a “2050 Compliant” scenario in California, defined as reducing emissions to 80% below 1990 levels by 2050.³ The generation mix analysis considers three “corner point” scenarios: 1) a High Renewable Energy scenario, 2) a High Nuclear scenario, and 3) a High Carbon Capture and Sequestration (CCS) scenario. In addition, we also consider a “Blended” scenario which includes all three of these generation types.

In each scenario, the characteristics of electric demand are driven by a number of variables in the study, including: 1) *Energy efficiency*, which reduces electric demand and shifts the electric demand profile to off-peak hours; 2) *Electrification* of fossil fuel use to electricity, especially in the form of electric vehicles; 3) *“Smart charging”* of electric vehicles, which is assumed to shift new electric load to off-peak hours; and 4) *The availability of energy storage and the quantity of wind power* on the electric grid relative to total electric loads. While energy storage is used to moderate fluctuations in electric demand and energy production, intermittent wind energy requires an increase in the availability of fast-response load following resources,

¹ Wald, M. “Big Utility to Close 11 Plants Using Coal,” *The New York Times*, Business, December 2, 2009.

² Straub, N. and Behr P. “Energy Regulatory Chief Says New Coal, Nuclear Power Plants May be Unnecessary,” *The New York Times*, Greenwire, April 22, 2009.

³ In 2005, California Governor Schwarzenegger's Executive Order S-3-05 committed the state to reduce GHG emissions to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050. In 2006, the state legislature passed Assembly Bill 32, codifying the goal of reducing emissions to 1990 levels by 2020 into law.

such as energy storage, to main electric reliability.

We use the results of a simple model of California's energy demand and GHG emissions through 2050 developed by Energy and Environmental Economics, Inc. (E3). The spreadsheet-based model accepts policy decisions and technology choices as input assumptions to find cost, GHG emissions and electric supply and demand, consistent with those assumptions. In addition, the development of each generation mix scenario is constrained by reality checks on the operability of the electric system.

We find that in the 2050 Compliant case there is a significant need for both baseload and load-following low-carbon generation resources. In the 2050 Compliant case electricity demand is expected to grow faster than under the Baseline case, even with aggressive energy efficiency assumptions. This is because energy efficiency savings are more than offset by the effects of fuel switching, largely due to a heavy reliance on electric vehicles to reduce emissions from the transportation sector. In addition, electric vehicles must charge during off-peak hours: such "smart charging" contributes to significantly flattening the demand profile, making it more cost-effective to bring additional baseload power on-line, while reducing the total amount of capacity additions needed to meet peak demand in the 2050 Compliant case.

Somewhat surprisingly, we do not find a huge cost differential between the four generation mix scenarios, after taking into account expected "learning curve" cost reductions of renewable energy and CCS. There are other important tradeoffs between each generation mix scenario however. The High Nuclear case results in over-production of electricity during some time periods, requiring exports of power, or some alternative use for the power such as hydrogen production. The problem of nuclear waste disposal must also be solved before the High Nuclear case could represent a viable future. The High Renewables Case results in large amounts of intermittent generation, which must be balanced with at least 12,000 MW of incremental energy storage, the highest amount of energy storage required in any of the scenarios. In both the Blended scenario and the CCS scenario, natural gas with CCS provides sufficient low-carbon, load-following generation to meet demand without excess generation and with fewer reliability challenges than the other scenarios.

Integrating Variable Energy Resources while Maintaining Reliability:
The Role of Integrating Services and the Importance of Proper Cost Allocation

By
Jeffrey Nelson
Paul Nelson

Policy and preference continue to drive increased Variable Energy Resources (VERs) penetration throughout all regions of the United States. In order to reliably operate the electricity grid in the presence of increased generation variability, studies and real-world experience indicate system operators require increased real-time operating flexibility. Typically these additional services manifest as some variation of increased regulation, ramping capability, following, or spinning reserves. Regardless of their exact specification, securing these additional integrating services comes at a cost. This paper explores recent developments concerning VER integrating services, procurement mechanisms and cost allocation, with a focus on California, the Bonneville Power Administration, and the FERC. It explores innovation and recommends areas of further exploration. Moreover, the paper argues that market and operational efficiency can be achieved by allocating related integration costs back the VER resources, based on cost causation principles. As demonstrated, this cost allocation approach produces superior short-term and long-term incentives when compared to several other alternatives.

**Reality-Based Benefit-Cost Assessment of Demand Side Management Integration:
Methods to Maximize Market Capture in Organized markets**

Eric Woychik, Hua Fang, and Mark Martinez

Abstract: The traditional approach of deterministic benefit-cost assessment continues to be used in regulatory proceedings, while utility planners increasingly use more realistic methods that rely on expected (probability weighted) value methods. The new world of resource assessment is increasingly complex as renewable portfolio standards drive the need to integrate variable electricity resources (VERs), particularly wind and solar power. Integration of VERs requires greater control of both loads and generation, including rapid locational response, more dispatchable ramping (load-following) capacity, and more frequency regulation (Reg-up and Reg-down). Increasingly, more high-impact small probability events loom to alter future resource use. For example, minimum load conditions may threaten reliability when VER production increases and dispatchable generation can not be ramped down. More dispatchable resources are needed to respond to contingencies, dynamically balance renewable variability, and respond to charging of plug-in vehicles.

This paper defines the benefits of improved reality-based assessment methods to determine resource decisions that increase capture of time-varying benefits and costs. This includes the dynamics of resource adequacy, load-following, operating reserves, emergency capacity, energy, frequency regulation, market power mitigation, environmental externalities, and distribution load-management. Advances required in the California Standard Practice Manual for cost-effectiveness (SPM) suggest these benefits be fully integrated to capture all market related benefits. The focus is to compare cost-effectiveness of dynamic demand-side resources based four approaches: i) the standard SPM avoided costs, ii) the standard SPM expanded to capture the full set of market and non-market benefits, iii) option value methods to capture market and non-market benefits, and iv) Monte-Carlo methods to capture market and non-market benefits. Industrial sector case studies are used to make these comparisons. The relative costs to perform each of these four approaches are compared to the increased benefits defined with each approach. Conclusions and recommendations for further research are offered.

Technique for Reserve Determination with Consideration for Conventional and Emerging Technologies: Enhancement of Stochastic Optimal Power Flow

T. Yong and R. Entriken

Stochastic optimal power flow techniques have been used in formulating the reserve determination problem to address the issue of the increasing penetration of intermittent generation. Enhancements to the reserve determination model have been implemented in this report to accommodate the system ramping capability and coexistence of multiple random variables. In addition, risk measures are added into the solution report to provide a quantitative measure of risks of energy schedules.

Market reserve validation and post-contingency fast re-dispatch have been illustrated in this report to demonstrate two immediate applications of reserve determination model. System operation and planning can use these applications to mitigate the system uncertainty and improve the system reliability.

24th ANNUAL WESTERN CONFERENCE

**Portola Hotel & Spa
Monterey, California, U.S.
June 15-17, 2011**

Professor Roger Buckland
Chair of Accountancy
University of Aberdeen
Scotland

Risk, Volatility and Regulation in Water Supply and Distribution

Abstract

This paper addresses a core issue for the regulated utility: what is the risk taken by investors in organizations that supply a product whose supply is regulated? Prior research on the returns of regulated water supply and distribution companies in the UK concluded that regulation interacts significantly with equity returns and that the systematic risk – and hence required returns – of water utilities' equity were low and decreasing over time (Buckland and Fraser, 2001).

The current research analyses the returns on securities issued by regulated water companies in several differently-regulated economies, notably in the US, the UK and other economies in Asia and continental Europe, using data from 2000-2010. Mirroring the results of the analysis of data from the 1990s, the results suggest that regulators chronically overestimate the risk borne by investors in water utilities, resulting in lax pressures on permitted returns and higher prices than are needed to provoke efficient supply. The paper also explores the interaction of regulators' actions and the risks borne by investors; and it examines the spillover effects of volatility in the markets for utilities' equity.

Buckland, R and P Fraser (2001), 'Political and Regulatory Risk in Water Utilities: Beta Sensitivity in the United Kingdom', *Journal of Business Finance & Accounting*, vol. 28(7/8), pp877-904 [ISSN 0306-686X]

Robert Earle
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Using Markets to Regulate Nutrient Water Pollution

Nutrient water pollution principally consists of dissolved nitrogen and phosphorus in various forms. While both of these occur naturally, they are also present due to human activity and can be found, for example, in industrial wastewater, water from waste treatment plants, and storm water runoff. While these nutrient pollutants may nourish some parts of an ecosystem they can have adverse health effects in high concentrations. The more immediate concern, however, is the nutrients' ability to disrupt an ecosystem by encouraging the growth of algae blooms that rob fish and other life of dissolved oxygen. Complicating matters, some ecosystems seem to be more sensitive than others to increased nutrient levels. pollution that nourishes some parts of an ecosystem, which then overwhelm other parts. In a recent rulemaking, the EPA has relied on command-and-control mechanisms rather than more effective market approaches to limiting surface water pollution. In addition, in its proposed rule, the agency's approach to cost-effectiveness analysis will discourage other states from implementing water quality regulations of their own. This paper analyzes the rulemaking in light of other programs that have successfully regulated water pollution through the use of markets for tradable rights.

Rami Kahlon

Water Action Plan – The New New Plan for California Water Utilities

When the Commission first adopted its Water Action Plan in 2005, it essentially changed the business model for investor water utilities operating in California from selling water to conserving water. WAP called for revenue adjustment mechanisms, full cost balancing accounts, inclining tiered rates and greater conservation spending. In early 2008, after three years of below average rainfall, the governor called for a 20% reduction in municipal water use by 2020. Later that year, the global financial crisis hit. The result of the on going drought and recession resulted in year over year declines in water sales. Water conservation remains at the top of the loading order in the 2010 plan update. Combined with slower growth, declining water use mandated by law, the ability of ratepayers to continue to pay ever increasing water bills, and increasing needs for water infrastructure replacement, the business challenges for water utilities are great. This paper will examine constraints, opportunities and challenges posed by the Water Action Plan 2010 update.

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Electric Vehicle Penetration Study Using Linear Discriminant Analysis

The impending mainstream availability of battery electric and plug-in hybrid electric vehicles, like the Nissan Leaf and Chevy Volt, presents a potentially interesting obstacle for an electric utility. The unplanned arrival of several electric vehicles to a neighborhood could overwhelm the distribution equipment. This is especially relevant for areas with moderate climates where the distribution system does not have excess capacity for air conditioning.

PG&E has mapped a database of demographic information for its service territory using data from the U.S. Census to its existing customer information databases. Using this demographic data along with electric usage data for neighborhoods where customers have or have had an electric vehicle, PG&E has developed a methodology to predict neighborhoods in which electric vehicles are most likely to have highest penetration. These areas of likeliest adoption were chosen using a linear discriminant analysis model of the PG&E service territory to find areas with similar demographic and usage characteristics to those which already have an electric vehicle. One great benefit to this analytic method is that is simple to update as more customers purchase electric vehicles and the customer demographics shift through time.

Overlaying the results of the electric vehicle penetration studies on distribution system planning maps using geographic information systems (GIS) technology provides system planners with an easy way to identify and prioritize areas of the distribution system which may be most in need of upgrading to accommodate electric vehicles.

The Potential Benefits for Electricity Customers from Controllable Loads

by

Tim Mount, Max Zhang, Wooyoung Jeon and Alberto Lamadrid

Dyson School of Applied Economics and Management

Cornell University

Abstract

With higher penetrations of variable generation from renewable sources, the need to install effective forms of storage capacity on the electric delivery system is critical. However, installing dedicated storage capacity designed only to mitigate the variability of generation from a wind farm, for example, is likely to be prohibitively expensive. Earlier research has shown how the discharging and charging of electric vehicles can be used to smooth daily load cycles as well as provide regulation to support the reliability of supply. If the owners of electric vehicles are compensated correctly for providing these services, the overall cost of operating the vehicles is reduced. Since the primary purpose of the batteries in electric vehicles is to provide a means of transportation, the substantial cost of a battery is shared between transportation and supporting the grid. This provides a relatively inexpensive form of storage capacity for the grid. The objective of this paper is to extend the concept of controllable loads to include thermal storage, and in particular, the use of ice batteries to replace standard forms of air-conditioning. The potential benefit of this type of storage is that a substantial amount of the peak system load on hot summer afternoons can be moved to off-peak periods at night. Instead of using air-conditioners when space cooling is needed, ice can be made when it is convenient for the system. Similar arguments can be made for space heating using oil, for example, to store heat. In this way, thermal storage can be used to mitigate variable generation and to reduce the total amount of generating capacity needed to maintain System Adequacy.

The analysis uses a new version of the SuperOPF that allows for multi-period optimization applied to a reduction of the NPCC network for New York and New England. Typical days are defined to represent the annual pattern of load for the NPCC region. This makes it possible to determine the total annual operating cost of meeting the system load. In addition, the amount of “missing money” is determined for both generators and transmission owners to give a total annual system cost that includes both operating and capital costs. The results compare these total costs for the NPCC network with and without controllable loads.

Providing Grid Services with a Fleet of Plug-in Electric Vehicles
Nicole Taheri and Robert Entriken

This paper describes basic model for the decision-making process of the aggregator is described mathematically and implemented in the General Algebraic Modeling System (GAMS). We use real data with the implementation to predict the behavior of the system. The data input to the model is based on realistic driving patterns, electricity and gas prices, and vehicle characteristics. The implementation then outputs the charging and discharging schedules that will maximize the profit of each involved parties.

Valuing Delayed Capital Investments

Fred L. Curry

The Financial Standards Accounting Board requires regulated utilities to use Interest During Construction (IDC) in the valuation of facilities for inclusion in rate base. The CA PUC allows utilities to use Allowance for Funds Used During Construction (AFUDC) for this purpose. This paper will investigate the issues of requiring the use of IDC and the appropriate use of AFUDC. It will then address the valuation of facilities that are not immediately included in rate base when they are used and useful and propose the use of an AFUDC proxy to capitalize those facilities, when they are included in rate base.

This is a financial paper, not an economic one, but it has practical application across many industries (small telephone, small water and small power) that are reluctant to or do not immediately include new facilities in rate base, for various reasons.

PURCHASED POWER CONTRACTS AND REGULATED UTILITY COST OF CAPITAL

Paul T. Hunt
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ABSTRACT

Regulated electric utilities in the United States increasingly rely on purchased power as a source of power supply. This is not a new development, as purchased power has become an increasing share of power supply for regulated utilities in the United States during the last thirty years. With respect to the risk of utility debt, there are well-established methods that are used by credit rating agencies to translate purchased power contracts into “debt equivalents,” which are then incorporated into financial metrics that ratings agencies use in their analyses.

With respect to estimating the cost of utility equity, methods are less advanced. This paper uses cross-section data to investigate whether there is an identifiable increase in the cost of utility equity due to purchased power contracts. The analysis relies primarily on purchased power data from the FERC Form 1 reports of regulated utilities and cost of capital estimates for their parent holding companies derived from the Capital Asset Pricing Model. As purchased power contracts, especially purchased power contracts associated with renewable energy resources, continue to increase in importance, this analysis may provide useful data for utility regulators in determining the authorized cost of equity for regulated electric utilities.

The Determinants of Electric Utility Capital Structure: Re-examining the Turbulent 1980s

By

Karl A. McDermott

Ameren Professor of Business and Government

University of Illinois –Springfield

Abstract

“How do firms choose their capital structure? Again the answer is, we don’t know”.

Stewart Myers⁴

The 1980s were a turbulent time for many electric utilities. The combination of inflation, shrinking demand growth, escalating construction costs and excess capacity created a variety of financial stress. Construction cost disallowances, and other regulatory decisions had a direct effect on utility financing decisions. The enigma that is known as the capital structure, as Professor Myers quote above indicates, has been and remains a puzzle. In much of the empirical literature the concern has been over how capital structure decisions or leverage choices will impact the cost of equity capital. But even within that literature the results echo Professor Myers conclusions, for example, Robichek, Higgins and Kinsman⁵ noted

The implications of the preceding discussion is that a unique interpretation of the theoretically-derived leverage coefficient a , is not justified in practice, but that the ultimate test of leverage propositions for regulated firms must be empirical.

The question we will focus on in this paper is: What factors and managerial behavior play a role in determining an electric utilities choice of capital structure? Employing data from the decade of the 1980s on construction activity, regulatory disallowances, customer make up, demand growth, and a range of financial variables, we will employ a structural model that allow us to test how these factors interrelate with the standard theories of capital structure: Trade-off, Pecking Order, and Managerial Theories (i.e. Agency, Signaling, etc).

⁴ Stewart Myers, “Capital Structure Puzzle”, *Journal of Finance* (1984), p.575

⁵ A. Robichek, R. Higgins and M. Kinsman, “The Effect of Leverage on the Cost of Equity Capital of Electric Utility Firms”, *Journal of Finance*, Vol. 28, No.2 (1973), p. 355

The Determinants of Commission Total Revenue Decisions: A Case Study of Illinois Energy Utilities

By

Ashley Everette

And

Karl McDermott

University of Illinois Springfield

Abstract

The traditional method for evaluating the determinants of regulatory decisions has focused on the rate of return component of the rate case⁶. In this paper we will focus on the total revenue requirement granted in a rate case as a more comprehensive measure of both the political and economic tradeoffs that occur during the rate proceeding. While the rate of return is a significant factor, the total revenue requirement encompasses the complete operations of the utility. Receiving a high ROE when the total revenue request is only partially granted may imply that the utility may never earn its exceptionally good ROE award. In the rate-proceeding the utilities present to the commission their determination of a fair revenue requirement, and the commission awards the utility a certain percentage of this number based on their review of the various cost components for their prudence, fairness and reasonableness. The various parties to the proceeding sponsor testimony offering alternatives to the commission and the commission reacts to this information in a fashion similar to that of the Federal Reserve Bank weighing the various factors before making a decision. The question we seek to answer in this study is: what factors influence or determine the percentage awarded by the commission?

We will examine the various factors involved in determining the fair and reasonable revenue requirement. For example, the current rates compared to other utilities within the state, number of recent rate cases, the inflation rate, the unemployment rate, the date of the last rate case, and the political mix of commissioners all may influence how the final total revenue requirement number is derived and therefore what percentage of the number requested is granted by the commission. In the spirit of the original investigations this study will focus on energy companies in a single state (Illinois) in order to gain a more comprehensive understanding of the regulatory process occurring in that state over the last 30 years.

⁶⁶ See P. Joskow "Determinants of the Allowed Rate of Return in a Formal Regulatory Hearing" Bell Journal Vol. 3, No. 2 (1972)

Abstract: Preparing for a Reformulated Regulatory Process

Author: Dr. Alan E. Finder, KPMG

In this paper, the author discusses the downstream impacts of recent changes in states' approaches to regulatory control of rates. The changes in the regulatory control approach are generating a need to change how regulatory support organizations – primarily regulatory affairs departments at utilities and staffs of regulatory commissions – prepare for rate cases and other regulatory proceedings.

Using a qualitative approach, the paper describes:

- An overview of changes in components of regulatory control of rates including
 - Alternative regulation plans
 - Rate agreements
 - Pre-completion construction expenditures
 - Retail generation (restructured states) or fuel and purchased power [integrated utility (non-restructured) states]
 - Riders for infrastructure renewal, vegetation management, SmartGrid, etc.
- Associated changes in the review process
- Implications for staffing and training of changes in the review process
- Range of future outcomes for regulatory control and implications for further reformulation of the regulatory process and associated review mechanisms

Contemporary Evidence from California: Who Gains when Evidentiary Hearings are Held?

by L. Jan Reid
Coast Economic Consulting

ABSTRACT

Traditionally, evidentiary hearings were held during almost all of the energy ratemaking proceedings of the California Public Utilities Commission (CPUC). This is often referred to as the “litigation model of regulation.” In recent years, the CPUC has often used a “collaborative model,” in which proceedings are dominated by workshops and by several rounds of comments from practitioners (representatives of parties). My research reviews a number of CPUC energy regulatory proceedings, and compares the results of litigation proceedings with collaborative proceedings.

I review the literature concerning both the collaborative and the litigation models of regulation, and interview CPUC practitioners (attorneys and advocates) to determine their views on the two regulatory models. I briefly discuss the arguments of the proponents of the collaborative and the litigation models.

I perform a quantitative analysis of the results of the collaborative and the litigation proceedings by contrasting CPUC decisions in ratemaking cases with the initial positions of regulated utilities, consumer groups, and the CPUC’s Division of Ratepayer Advocates⁷.

⁷ The Division of Ratepayer Advocates was formally established by the CPUC in the 1980s. In 1996, the California state legislature mandated that the DRA’s mission was to represent ratepayers in proceedings of the California Public Utilities Commission.

New Transmission Planning Framework
Navin Bhatt, B. Barker, Robert Entriken

This paper looks at how various regulatory, economic and technical changes are likely to impact the framework for transmission planning.

It begins with an overview of the existing planning framework, structured along the lines of five key aspects that encompass the purview, role and responsibilities of transmission planning. The paper then explores seven future scenarios of transformative change in the electricity industry- ranging from the greater penetration of wind generation to broader regional planning - and summarizes their impact on each of the five key aspects that frame the transmission planning function, now and in the future.

Robert Earle
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Ryan Maddux
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Competition in Transmission Construction – Is it working?

Increased requirements for renewable electric power generation have resulted in the need for the construction of new transmission to bring the power generated by renewable from the areas most suited for renewable generation to load centers. For instance, in 2008, both John McCain and Barak Obama promised the nation new transmission infrastructure to help promote the development of renewable energy. Large interstate transmission projects have often been difficult to complete for two reasons. Construction of transmission for renewables faces a number of obstacles due to the coordination problems between generators and transmission owners that are typically separated in deregulated markets along with other issues such as siting. In order to encourage the development of new transmission for renewables, some jurisdictions such as Electric Reliability Council of Texas (ERCOT) and the United Kingdom have conducted competitive bidding processes for the development of transmission for renewable. Such a process has also been under consideration by the Ontario Energy Board (OEB) in Canada. This paper describes and compares the individual bidding processes administered by each jurisdiction as well as describes the characteristics of bidding “winners” and will analyze the traits that made them successful. In general, the financial health, past performance, and location of each winner was ultimately much more important than the cost quotes in each bid, when cost estimates were even requested. As such, competitive bidding may not be a viable solution for building interstate transmission line (unless sufficient regional coordination exists), but it may be viable for states with large renewable potential, large in state power consumption, and the political will to guarantee construction.

Jeff McDonald
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Abstract: Congestion Costs and Transmission Expansion

Traditional calculation of congestion cost is the product of shadow value and scheduled flow. This measure is accurate from a mathematical programming perspective, but can dramatically over-state the true cost of congestion. A more direct measure of this cost on the energy that is exposed to the price differences created by congestion is presented. This approach measures the impact of congestion on price and applies the impact to a more appropriate measure of exposed load. This will allow a more accurate ranking of transmission expansion projects as well as comparative market performance over time.

The Economics of Inclining Block Rates⁸

Ahmad Faruqui,⁹ Doug Mitarotonda,¹⁰ and Ryan Hledik¹¹

Nationally and regionally, there is strong policy interest in promoting energy efficiency and controlling greenhouse gas emissions. A variety of state commissions and utilities have begun examining the economics of inclining block rates (IBR) for electricity. Under IBR, customers pay per kWh as they consume more kWhs.

In the first section of our paper, we describe the current rate design landscape and examine why and where utilities are assessing the economics of IBR. We ask whether IBR would complement or substitute for other policies such as governmental codes and standards for buildings and appliances and utility rebates to promote the sale of energy efficient appliances and light bulbs.

In the second section, we address the three critical decisions that must be made when developing an IBR. First, how many tiers should the rate include? Second, what should be the usage cutoff level between each of those tiers? Finally, with the tiers and cutoff points established, how should the prices in each tier be set? This section closes with a discussion of how inclining block rates should be marketed to customers.

In the third section, we compare and contrast alternative methodologies for estimating the expected change in customer energy use from IBR. The modeling depends primarily on two factors. First, do customers respond to the average or marginal price of electricity? Second, how much do customers respond to changes in price (i.e. price elasticity of demand). We explore customer response to marginal prices, average prices, and a combination of these approaches, over a range of elasticity assumptions. We find that marginal prices predict the highest customer response while average prices predict the least.

⁸ This paper is submitted for consideration at the Western Conference.

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¹⁰ *The Brattle Group*, 353 Sacramento Street, Suite 1140, San Francisco, CA 94111. Plans to attend Western Conference.

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California's Inverted Block Rate Structure: Rate Design, Public
Policy, and Customer Relations

Dennis M. Keane

Pacific Gas and Electric Company

During the energy crisis in the early 1990s, state legislators enacted Assembly Bill 1X which mandated that the investor-owned utilities move to multiple-tier, inclining-block, rates for residential customers -- with the rates frozen for the two lowest tiers at then-current levels. At about the same time, state regulators froze rates for low-income customers. The combination of these two actions has led, over the last decade, to soaring high-tier rates reflecting prices far in excess of cost of service. For Pacific Gas and Electric Company (PG&E), for example, Tier 5 rates reached a level of 44 cents per kWh during the Summer of 2009, leading to very high bill increases for a segment of customers during extreme weather months. Subsequently, they reached a level of nearly 50 cents per kWh in early 2010, before PG&E's Summer Rate Relief Application dropped the highest-tier rate to 40 cents per kWh. In Phase 2 of PG&E's 2011 General Rate Case (GRC), PG&E has proposed a number of further measures to alleviate the high upper-tier rate problem.

This paper presents a case study of PG&E's residential rates since the energy crisis, and how the high upper-tier rate problem came to a boil during the summer of 2009. After briefly reviewing the history of increasing-block rates in California, the paper summarizes the rate structures and levels that existed in the early 1990s when the energy crisis hit. The paper then describes how rates have evolved since, given the legislative and regulatory constraints under which rate designers operated, culminating with the customer backlash in the Summer of 2009. The paper concludes with a discussion of the various alternatives PG&E has proposed, initially in its Summer Rate Relief Application and later in its GRC Phase 2 filing, for solving the problem and the associated regulatory, political, and public relations challenges of each -- given the presence of multiple parties (customer groups, distributed generation owners and vendors, environmental groups) with an interest in maintaining the status quo.

Reconsidering Residential Rate Structures in California

Scott Murtishaw, CPUC

The residential electricity rate structures of California's large investor-owned utilities (IOUs) are quite complicated. California first adopted a two-tier, inclining block residential rate in the 1970s with the tier 1, or baseline quantity, sold below cost. Due to the climatic diversity within the state, the IOU's service territories are divided into multiple climate zones, each with a different baseline quantity. In the wake of California's electricity crisis, the California legislature passed Assembly Bill 1X, which froze residential retail rates for all usage up to 130% of the baseline quantity. This provision necessitated the creation of at least one additional tier to account for usage above 130%. In response to AB 1X, the California PUC and the state's IOUs developed a five-tier increasing block rate structure. With rates in tiers 1 and 2 frozen, all increased revenue requirements since 2001 have been collected from the approximately one quarter of residential usage that falls into tiers 3 through 5, leading to upper tier rates that are far above the cost of service. This paper questions the rationales underlying the current rate structure, examines the complexity of overlaying time of use rates onto this tiered structure, analyzes its geographic distributional effects, and explores the consequences of implementing a single service territory-wide tariff for each IOU.

Proposed Abstract for CRRRI Conference-2011

Analyzing California's Resource Adequacy across Many Futures

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Assessing the requirements to meet high electricity demands used to be simply picking a forecasted single hour peak load and adding up the expected available generation capacity. Until recently NERC regions conducted just this type of "resource adequacy" (RA) assessment. However, several trends have led to reconsideration of how to conduct RA analysis. The rise of variable resources such as renewable generators and customer-side of the meter demand response and distributed generation has introduced some resources that, like customer load and forced outages of thermal units, must be addressed probabilistically because they cannot be precisely forecasted or directly controlled by system operators. Variable output and the minimal amount of energy storage has led some operators to argue for maintaining resource reserves around the clock for all variable generation. The move towards merchant generation has similarly introduced an additional source of uncertainty for planners and operators. And greater regional interconnection has introduced both more variability and more opportunity for resource sharing due to network conditions. The increasing number of sources of uncertainty and the need to maintain reliability and account for the resulting risks has led to development of new methods and tools to conduct such analysis. For example, PG&E and the CAISO are currently proposing methodologies that account for variability associated with integrating renewable energy sources in the CPUC LTPP proceeding but these methodologies do not address the effects of more traditional sources of uncertainty such as thermal unit failure, demand variability and forecast error. This paper presents the framework and results of conducting a RA analysis accounting for several different sources of uncertainty, including load forecasts, customer-side resources, intermittent renewables, large thermal unforced outage uncertainty and transmission pathways. The model focuses on presenting a simplified rendition of the system so as to allow for analyzing many different scenarios and assessing the most significant potential vulnerabilities. The model is applied specifically to California, looking forward over the next decade.

Getting Needed New Generation Built When Not Needed for
Planning Reserve Margin Requirements

By
Gary Stern

In Southern California, there is a paradigm shift underway in the basis and process for new generation needs. As a result of a downturn in the economy, and the imposition of a 33% renewables portfolio standard, it appears that the next decade will have sufficient generating capacity to satisfy peak load conditions plus a planning reserve margin of 15-17%. However, studies in two different areas may be leading to the conclusion that new generation is required to maintain reliability in the grid. First, the addition of substantial new renewable generation is likely to be met primarily with wind and solar resources, both intermittent in their nature. To handle this intermittency, CAISO studies and other analyses are showing that increased levels of flexible, dispatchable resources will be needed to control the grid, compared to current and forecast levels over the next decade. Furthermore, in Southern California, as a result of new rules governing the use of once-through cooling technologies currently employed by many coastal generation facilities, we are likely to see some generation shut down in regions that will then need new generation additions or new transmission, to maintain a reliable grid in the area. This paper will explore the regulatory mechanisms that might be used to identify these new generation needs, as well as addressing the appropriate cost responsibility for this new generation.

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Interconnection for Renewables: Lessons/Challenges from the Ground Floor

There has been significant interconnection process and regulatory reform over the recent years and further reform is anticipated. This all has been driven by renewable project developers request to interconnect to the grid or distribution system. Additionally, the new Governor has made statements that he is interested in pursuing a policy of significant distributed generation. This presentation will explain the key interconnection process reforms and transmission ratemaking policies that have encourage renewable project development.

Abstract: The Contribution of the *Journal of Regulatory Economics*

Michael A. Crew and Paul R. Kleindorfer

At the 20th Eastern Conference, we presented a commentary on developments in regulatory economics over the previous twenty years. One of these developments included the founding of JRE. In this paper we discuss the role of the JRE in regulatory economics over the last thirty years building on our previous paper. Regulatory economics was hardly a new topic in micro applied economic theory when it was first published in 1989. Its motivation was based on the growing literature in regulatory economics and the change in direction taken by the previous leading outlet in regulatory economics, the RAND Journal. The time seemed ripe for a journal devoted to solely to regulatory economics and subsequent events proved this to be the case. There was no shortage of interest in the JRE with many more submissions than published papers. 625 articles totaling 12,026 pages were published in the period 1989-2010. This paper *inter alia* reviews the evolving nature and direction of regulatory economics through the lens of the JRE. The first Volume consisted of 25 articles; in 2009 it contained 31 articles. In 1995 the content was increased by 50 per cent by changing the frequency of each Issue from quarterly to bi-monthly. JRE was first published on line in addition to traditional hardcopy in 1998. Since its inception JRE has featured a number of survey articles and Special Issues, including January 2002, which contained selected papers from the 20th Annual Eastern Conference from leading scholars in regulatory economics, including the late Alfred Kahn, William Hogan, and the late Almarin Phillips. This paper builds on Crew and Kleindorfer (2002) in this same Special Issue, which examines advances in regulatory economics over the previous 20 years.¹² Its added contribution is its assessment of the impact of JRE on the literature of regulatory economics and its inter-relationships with policy and practice. Finally, some implications for the likely future direction of regulatory economics are developed.

References

Darryl Biggar, "The Fifty Most Important Papers in the Economics of Regulation," unpublished, 29 January 2010
Crew, Michael A. and Paul R. Kleindorfer, "Regulatory Economics: Twenty Years of Progress?" *Journal of Regulatory Economics*, 21,1, January 1002, 5-22.

¹² Others have undertaken such exercises, of particular interest being Biggar (2010)