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Electricity Regulation In the US: A Guide

SECOND EDITION

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June 2016

Foreword to the Second Edition

The original 2011 edition of *Electricity Regulation in the US: A Guide* has proven to be a handy reference for many people in the field. It was designed to be an introduction for the newly appointed regulatory commissioner, the first-time rate case participant, or the newly hired regulatory analyst. We think it has served that function well.

This revised edition includes updates to every chapter, and a number of new chapters. The new chapters include Integrated Distribution System Planning and Renewable Energy, plus a greatly expanded chapter on Regulatory Treatment of Environmental Compliance Costs.

The balance between completeness and brevity is a difficult challenge. We want this handbook to be short enough that it is not intimidating, current enough to be relevant, and complete enough to provide initial guidance on almost any regulatory topic. It is no substitute for Charles Phillips' *The Regulation of Public Utilities*, or Bonbright's seminal *Principles of Public Utility Rates.* Each chapter refers the reader to other resources that cover that topic in greater detail. Many of these are RAP publications, and we encourage all readers to visit www.raponline.org and peruse our library of publications, presentations, and webinars.

Dozens of readers of the first edition contributed ideas that led to this update. The regulatory world is not static, and things will continue to change. Don't hesitate to contact us with things you think need to be added, things that are inadequately explained, or areas where you think we don't quite get it right.

This update has been a project involving most of RAP's team, but it builds strongly on the effort for the first edition. Our inside team included Jim Lazar, an economist with 38 years of experience in utility regulation, as lead author, plus Carl Linvill, Rich Sedano, John Shenot, David Littell, David Farnsworth, and Ken Colburn as authors of the new material. The internal review team included Rick Weston, Riley Allen, Donna Brutkoski, and Becky Wigg. Our outside review team includes former Commissioners Jeff Goltz (Washington State), Ron Binz (Colorado), Bob Lieberman (Illinois), Tim Woolf (Massachusetts), and Karl Rabago (Pace University). We cannot forget the work on the first edition of Edith Bayer, Christopher James, Thad Curtz, Wayne Shirley, and Diane Derby.

All of this was under the careful watch of Rich Sedano, US Team Leader, and Camille Kadoch, RAP Publications Manager.

Jim Lazar
Olympia, Washington June, 2016

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Acronyms

AC	Alternating Current
AFUDC	Allowance for Funds Used During Construction
AMI	Advanced Metering Infrastructure
APPA	American Public Power Association
BPA	Bonneville Power Administration
CAA	Clean Air Act
CAPM	Capital Asset Pricing Model
CCR	Coal Combustion Residuals
COU	Consumer-Owned Utility
CPCN	Certificate of Public Convenience and Necessity
CPP	Clean Power Plan
CSAPR	Cross-State Air Pollution Rule
CVR	Conservation Voltage Regulation
CWA	Clean Water Act
CWIP	Construction Work in Progress
DC	Direct Current
DCF	Discounted Cash Flow
DER	Distributed Energy Resources
DG	Distributed Generation
DRP	Distribution Resource Planning
EERS	Energy Efficiency Resources Standards
EFSEC	Energy Facilities Site Evaluation Council
EGU	Electricity Generating Unit
EIM	Energy Imbalance Market
EIS	Environmental Impact Statement
EPA	(US) Environmental Protection Agency
ERCOT	Electric Reliability Council of Texas
EU-ETS	European Union Emission Trading System
EV	Electric Vehicle
FAC	Fuel Adjustment Clause
FACT	Flexible AC Transmission System
FERC	Federal Energy Regulatory Commission
G&T	Generation & Transmission Cooperative
IDP	Integrated Distribution Planning
IOU	Investor-Owned Utility
IPP	Independent Power Producer
IRP	Integrated Resource Planning
ISO	Independent System Operator
kV	Kilovolts
kWh	Kilowatt-Hour
LEED	Leadership in Energy and Environmental Design
LIHEAP	Low Income Home Energy Assistance Program
LIRP	Localized Integrated Resource Planning
LPPC	Large Public Power Council

MATS	Mercury and Air Toxics Standards
MWh	Megawatt-Hour
NAAQS	National Ambient Air Quality Standards
NASEO	National Association of State Energy Officials
NASUCA	National Association of State Utility Consumer Advocates
NEB	Non-Energy Benefit
NEM	Net Energy Metering
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Council
NO_X	Nitrogen Oxides
NRECA	National Rural Electric Cooperative Association
NUG	Non-Utility Generator
OASIS	Open Access Same-Time Information System
OATT	Open Access Transmission Tariff
OPI	Other Program Impacts
PACT	Program Administrator Cost Test
PBR	Performance-Based Regulation
PCT	Participant Test
PGA	Purchased Gas Adjustment
PIPP	Percentage of Income Payment (Programs)
PMA	Power Marketing Agency
PPA	Power Purchase Agreement
PUC	Public Utility Commission
PURPA	Public Utility Regulatory Policies Act
PV	Photovoltaic
RCRA	Resource Conservation and Recovery Act
REC	Renewable Energy Certificate
REV	Reforming the Energy Vision
REZ	Renewable Energy Zone
RGGI	Regional Greenhouse Gas Initiative
RIIO	Revenue = Incentives + Innovation + Outputs (British)
RIM	Ratepayer Impact Measure (Test)
RPC	Revenue Per Customer
RPS	Renewable Portfolio Standard
RTO	Regional Transmission Organization
SBC	System Benefit Charge
SCADA	Supervisory Control and Data Acquisition
SCR	Selective Catalytic Reduction
SEP	State Energy Program
SFV	Straight Fixed/Variable (Pricing)
SNCR	Selective Non-Catalytic Reduction
SO_2	Sulfur Dioxide
SQI	Service Quality Indices
TOU	Time-Of-Use
TRC	Total Resource Cost (Test)
TVA	Tennessee Valley Authority

UC	Utility Cost (Test)
VER	Variable Energy Resource
VOC	Volatile Organic Compound
VOST	Value of Solar Tariff
WCI	Western Climate Initiative

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About This Guide to Utility Regulation

Over the past 150 years, society has undergone a fundamental transformation. The invention of the incandescent light bulb in the 1870s introduced lighting as one of the first practically available uses of electrical power. Electric utilities began to spring up in major cities during the 1880s, and by the 1900s they had spread across the United States. While investor-owned utilities served urban areas and industrial customers prior to World War I, a drive for universal service was launched in the 1930s, with the creation of the Rural Electrification Administration, now the Rural Utilities Service in the US Department of Agriculture. The National Academy of Engineering designated electrification as the 20th century's greatest engineering achievement, beating the automobile, computers, and spacecraft.

This conclusion is hardly surprising when one considers the intricate web of wires that connects every light switch in the United States to massive power plants, individual rooftop solar panels, and every source of electricity **generation** in between. Add to this the layer of pipes that runs underground to feed stovetops, power stations, and factories with natural gas, and you have the foundation on which modern society has been built.

The utility grid of interconnected electric and natural gas infrastructure continues to grow as the US population expands and demand for energy increases. In 2014, US consumption of energy (electricity and all fuels including natural gas) to power industry, residential homes, commercial establishments, and all transportation was 98 quadrillion BTUs.

Although the transportation sector has been served by competitive providers since the 1920s, electricity and natural gas service was deemed to be a natural monopoly because of economies of scale and the significant capital necessesary to build power plants, transmission lines, and natural gas pipes and plants. Electricity and natural gas companies developed what we now recognize as monopolies offering electricity and natural gas service from a single provider on largely unnegotiable terms as discussed subsequently. To address the disparity in economic leverage between the customer and the monopoly provider, regulation of the utility system has evolved over the past 150 years to ensure that the system is reliable, safe, and fairly priced.

This guide focuses on electric and, to a much lesser extent, gas utility regulation in the United States, and is meant to provide a basic understanding of the procedures used and the issues involved. Many of the concepts and methods discussed are also applicable to other regulated industries and to self-regulated, consumer-owned electric utilities.

The purpose of this guide is to provide a broad perspective on the universe of utility regulation. The intended audience includes anyone involved in the regulatory process, from regulators to industry to advocates and consumers. The following pages first address why utilities are regulated, and then provide an overview of the actors, procedures, and issues involved in regulation of the electricity and gas sectors. The guide is intended to serve as a primer for new entrants and assumes that the reader has no background in the regulatory arena. It also provides a birds-eye view of the regulatory landscape, including current developments, and can therefore serve as a review tool and point of reference for those who are more experienced.

Utility regulation is also a political endeavor, however. Regulators are either appointed by elected officials, or they are directly elected to office. Their job is not only to administer the law in a fair, just, and reasonable fashion, but also to facilitate the achievement of the purposes of those laws. This guide does not attempt to address the political side of regulation. Every state and region has local circumstances, local political goals, and expects distinct results from its regulators. In every state, the laws under which regulators operate are different. And the goals set by voters change—sometimes rapidly—over time. It would not be useful to draft a single guide to the political aspects of regulation, and it would be inappropriate for the Regulatory Assistance Project, a non-profit educational organization, to attempt to do so. The politics may be at least as important as the framework we address in this guide. The reader will need to seek other sources for guidance on the politics of regulation.

These chapters briefly touch on most topics that affect utility regulation but do not go into depth on each topic, as we have tried to keep the discussion short and understandable. For more in-depth analysis of particular topics, please refer to the list of reference materials at the end of each chapter. The Regulatory Assistance Project publishes detailed reports on particular topics that provide a more comprehensive review of many topics in this guide, which are available online at www.raponline.org. Also, a lengthy glossary appears at the end of this guide to explain utility-sector terms.

1. The Purpose of Utility Regulation

Electric (and natural gas) utilities that deliver retail service to consumers are regulated by state, federal, and local agencies. These agencies govern the prices utilities charge, the terms of their service to consumers, their budgets and construction plans, and their programs for **energy efficiency** and other services. Utility impacts on air, water, land use, and waste product disposal are typically regulated by other government agencies. Environmental and land use regulation is generally beyond the scope of this guide, except with respect to a discussion of federal regulation of air pollution emissions, water discharges, and waste disposal from power plants in Chapter 20.

Two broad, fundamental principles justify governmental oversight of the utility sector. First, because a utility provides *essential services* for the well-being of society—both individuals and businesses—it is an industry "affected with the public interest."[1] The technological and economic features of the industry are also such that a single provider is often able to serve the overall **demand** at a lower total cost than any combination of smaller entities could. Competition cannot thrive under these conditions; eventually, all firms but one will exit the market or fail. The entities that survive are called *natural monopolies*, and, like other monopolies, they have the power to restrict output and set prices at levels higher than are economically justified. Given these two conditions, economic regulation is the explicit public or governmental intervention into a market that is necessary to achieve public benefits that the market fails to achieve on its own. In recent years, the power supply element of the electric utility industry has been subject to greater competitive pressures, and in some states (and countries) has been excluded from economic regulation (but not from environmental regulation).

This chapter covers the overall context in which utility regulation operates, as a preface to discussing the structure of the current industry and the regulatory framework that has evolved with it.

1 The term "affected with a public interest" originated in England around 1670, in the treatises *De Portibus Maris and De Jure Maris,* by Sir Matthew Hale, Lord Chief Justice of the King's Bench.

1.1. Utilities are "Natural Monopolies"

In 1848, John Stewart Mill published an analysis of natural monopolies, noting that, "(a) Gas and water service in London could be supplied at lower cost if the duplication of facilities by competitive firms were avoided; and that (b) in such circumstances, competition was unstable and inevitably was replaced by monopoly."[2] The arc of policy in the United States has generally been toward introducing competition where it is the most efficient model for allocating resources and meeting essential needs. The natural monopoly concept still applies to at least the network components of utility service (that is, to their fixed transport and delivery facilities). However, even where there is sufficient competition among the providers of energy supply and/or retail billing service, the utility sector's critical role in the infrastructure of modern, technological society justifies its careful oversight.

1.2. The Public Interest is Important

Regulation is intended to protect the "public interest," which comprises a variety of elements. Utilities are expected to offer (and in the United States, provide) service to anyone who requests it and can pay for it at the regulator's (or government's) approved prices. In this sense, service is "universal." A **connection charge** may be imposed if providing service involves a significant expenditure by the utility, but even that is subject to regulation and, in many cases, is subsidized in some manner by other customers or taxpayers.[3] Although some public services, like fire and police protection, are provided by government without many direct charges to users, utilities (even when government-owned) are almost always operated as self-supporting enterprises, with regulations dictating the terms of service and prices.

Utilities must also adhere to strict government safety standards, because their infrastructure runs throughout our communities and the public can be adversely affected by sagging wires, ruptured pipes, and other problems.

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2 John Stewart Mill, cited in Garfield, P., & Lovejoy, W. (1964). *Public Utility Economics* (p. 15). Englewood Cliffs, NJ: Prentice Hall.

3 Strictly speaking, a subsidy exists when a good or service is provided at a price that is below its long-run marginal cost—that is, the value of the resources required to produce any more of it. Although some market theorists argue for pricing based on short-run marginal cost, that issue here is, in our view, an accident of history. In general, equilibrium—in which the market is operating as efficiently as it can and total costs are minimized—long-run and short-run marginal costs are the same, because the cost of generating one more unit from an existing power plant is the same as the cost of building and operating a new, more efficient power plant. Certainly, the long run—that period of time in which all factors of production (capital and labor) are variable—is the sensible context in which to consider the public-policy consequences of utility matters, because investments in utility infrastructure are, for the most part, extremely long-lived.

The production and **distribution** of electricity and natural gas also have environmental and public health impacts—from the emission of pollutants, through the use of public waters, on scenic views and land uses, and even from noise—that can adversely affect the public. Generating power often produces pollution; transmission and distribution lines have both visual and physical impacts on land use and ecological systems. By the same token, the availability of electricity and natural gas creates opportunities to use less-polluting fuels than oil or coal.

So, depending on the scope of authority delegated to them, regulators may therefore impose environmental responsibilities on utilities to protect these public interests. Regulators are granted specific powers by legislators, and this authority varies from state to state.

Because most utility consumers cannot "shop around" for utility distribution service among multiple providers as a result of the natural utility monopoly, regulation serves the function of ensuring that service is adequate, that companies are responsive to consumer needs, and that transactions like new service orders and billing questions are handled responsively. In addition, the utility is often a conduit—through the billing envelope or other communications—for information that regulators consider essential for consumers to receive.[4]

Finally, given utilities' crucial role in the economy and in society's general welfare, service reliability standards are often imposed as well.

1.3. Regulation Replaces Competition as the Determinant of Prices

For most businesses, the prices of goods or services that are sold are determined by what the customer or market will bear. In economic terms, markets will "clear" at the point where **marginal costs** equal the value that consumers, in the aggregate, set for the good or service; that is at the point where supply intersects with demand.

A different approach to price-setting is required for utilities, because competition and free entry into (and exit from) markets does not exist in natural monopolies, and some level of reserve **capacity** is necessary to assure reliable service. Regulators use a *cost of service approach* to determine a fair price for electric service, by which the aggregate costs for providing each class of service (residential, commercial, and industrial) are determined. Prices are set to recover those costs, plus a reasonable return on the invested capital portion of those costs, and allocated based on the sales made to each class.

4 In Chapter 3, we discuss the movement in many states toward restructuring or deregulation of the power supply function.

1.4. Regulatory Compact

Effectively, regulation constitutes an agreement between a utility and the government: the utility accepts an obligation to serve in return for the government's promise to approve and allow rates that will compensate the utility fully for the costs it incurs to meet that obligation. This implied agreement is sometimes called the *regulatory compact*.[5]

Despite the above phrasing, there is in fact no binding agreement between a utility and the government that protects utility ownership from financial accountability.[6] There are numerous examples of regulated utilities going through bankruptcy reorganization because the revenues found prudent and allowed by regulators were insufficient to cover the obligations entered into by utility management. Regulation is an exercise of the police power of the state, over an industry that is "affected with the public interest," whether that industry enjoys the right to operate as a monopoly provider or not.

The need for regulation of utilities arises primarily from the monopoly characteristics of the industry. The general objective of regulation is to ensure the provision of safe, adequate, and reliable service at prices (or revenues) that are sufficient, but no more than sufficient, to compensate the regulated firm for the costs (including returns on investment) that it incurs to fulfill its obligation to serve. The legal obligations of regulators and utilities have evolved through a long series of court decisions, several of which are discussed in this guide.[7]

5 This is entirely separate from the legal process for defining service territory boundaries. Some states provide for exclusive franchises, approved by the state, whereas others prohibit exclusive franchises. Others leave the franchising role to local government, where it may be as narrow as defining the relationship between the municipality as a regulator of construction activity and permitting the utility to have its facilities in (above and below) city streets and rights of way.

6 This is true in the United States. In other parts of the world, however, regulation by contract is quite common.

7 US Supreme Court case law on the topic begins with its 1877 decision in *Munn v. Illinois*, 94 U.S. 113 (which itself refers to settled English law of the 17th century—"when a business is 'affected with the public interest, it ceases to become *juris privati* only.'"), and runs at least through *Duquesne Light v. Barasch*, 488 US 299 (1989). Nowhere in that series of cases, including *Smyth v. Ames*, 169 U.S. 466 (1898), *FPC v. Hope Natural Gas*, 320 U.S. 591 (1944), and *Permian Basin Area Rate Cases*, 390 U.S. 747 (1968), does the Supreme Court accept the notion of a regulatory compact.

1.5. All Regulation is Incentive Regulation

Some analysts use the term *incentive regulation* to describe a system in which the regulator rewards utilities for taking actions to achieve, or actually achieving, explicit public policy goals. However, it is critical to understand that *all regulation is incentive regulation*. By this we mean that every regulation imposed by government creates limitations on what the utility can do; but every regulation also gives the utility incentives to act in ways (driven generally by the desire to maximize net income, or earnings) that may or may not promote the public interest. Given any set of regulations, utilities will take those actions that most benefit *their* principal constituencies—shareholders and management—while meeting the requirements of the regulations.

For more information:

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