

# Contents

<b>1</b>	<b>Introduction . . . . .</b>	<b>1</b>
1.1	Distinguishing Between Cost and Price . . . . .	1
1.2	Cost and Price in Our Daily Vocabulary . . . . .	2
1.3	The Credibility of Cost . . . . .	3
1.4	Total Cost of the Operation as a Whole . . . . .	4
1.5	Joint-Product Costs . . . . .	7
1.6	Price Relationships: The Baker Revisited— The Quantity Discount . . . . .	11
1.7	The Economics of Fixed (Overhead) Costs . . . . .	13
1.7.1	Production Within the Capability of Existing Plant . . . . .	14
1.7.2	Where Plant Expansion Is Required . . . . .	15
1.8	A Closer Look at Two-Part Pricing . . . . .	17
1.9	Competitive Pricing (Value to the Purchaser) . . . . .	18
1.10	From Wonderland to Reality . . . . .	18
1.10.1	The Baker . . . . .	19
1.10.2	The Utility . . . . .	19
1.10.3	A Broader Horizon . . . . .	20
1.10.4	Benefits vs. Costs . . . . .	20
1.11	Cost and Price-A Primer . . . . .	20
1.12	Conclusions, If Any . . . . .	22
<b>2</b>	<b>The Cost Approach to Pricing: The Direction of Cost . . . . .</b>	<b>25</b>
2.1	Preface . . . . .	25
2.2	Fixed and Variable Costs . . . . .	27
2.2.1	The “Readiness to Serve” Concept . . . . .	28
2.2.2	The “Use of Service (Product)” Concept . . . . .	29
2.2.3	Relative Proportion of Fixed and Variable Costs . . . . .	29
2.3	Decreasing, Constant, and Increasing Costs Conditions . . . . .	29
2.4	Decreasing Costs . . . . .	30
2.4.1	The Static Hypothesis . . . . .	30
2.4.2	The Dynamic Hypothesis . . . . .	33
2.5	The Base System . . . . .	34

2.6	Future Additions . . . . .	37
2.6.1	Decreasing Fixed-Cost Scenario . . . . .	38
2.6.2	Constant Fixed-Cost Scenario . . . . .	40
2.6.3	Increasing Fixed-Cost Scenario . . . . .	40
2.7	The Small Base-Load Plant . . . . .	42
2.8	The Peaking or Firming-Up Plant . . . . .	46
2.9	Power Purchases by Electric Utilities from Non-utility Sources, Bypass, and Discounts . . . . .	50
2.9.1	Purchase by a Utility . . . . .	50
2.9.2	Construction by the Utility of Its Own Plant . . . . .	51
2.9.3	Purchase of IPP Power . . . . .	51
2.9.4	Bypass of the Utility . . . . .	53
2.9.5	An Alternative to Bypass: A Discounted Price . . . . .	55
2.9.6	Arrested or Contracted Output . . . . .	56
2.9.7	Summary of Findings . . . . .	57
2.10	Variable Costs . . . . .	59
2.10.1	The Dominance of Variable Costs . . . . .	61
2.10.2	The Uncertainty of Variable Costs . . . . .	61
2.10.3	High Capital/Low Operating Costs vs. Low Capital/High Operating Costs . . . . .	62
2.11	Matters of Judgment . . . . .	63
2.12	A Note on Generating Plants . . . . .	66
2.13	A Note on the Level of Costs . . . . .	66
<b>3</b>	<b>The Cost Approach to Pricing: Joint Cost Allocations . . . . .</b>	<b>69</b>
3.1	Direct and Joint/Common Costs . . . . .	69
3.2	Cost Causation . . . . .	71
3.2.1	The Classification of Customers . . . . .	71
3.2.2	The Classifications of Services . . . . .	71
3.2.3	The Classification of Costs . . . . .	71
3.3	Utility Cost Allocation Theory . . . . .	73
3.4	The Functionalization of Costs . . . . .	74
3.5	Methods of Allocation . . . . .	74
3.5.1	The “Coincident Demand Peak- Responsibility” Method . . . . .	74
3.5.2	The “Non-coincident Demand Peak-Responsibility” Method . . . . .	76
3.5.3	Other Peak-Responsibility Methods . . . . .	77
3.5.4	Various Other Methods . . . . .	77
3.5.5	The “Phantom Customer” Method . . . . .	78
3.5.6	The Nordin Proposal . . . . .	78
3.5.7	Edison’s Improvements . . . . .	79
3.6	Distribution . . . . .	80
3.7	Rate Schedule Divisions of Cost . . . . .	81
3.7.1	Demand Costs . . . . .	81

3.7.2	Customer Costs . . . . .	81
3.7.3	Commodity Costs . . . . .	82
3.7.4	The “Perfect” Rate . . . . .	82
3.8	Suballocations . . . . .	82
3.9	The Total Cost and Incremental Cost Methods . . . . .	83
3.9.1	Marginal Costs . . . . .	84
3.9.2	Use of the Incremental Cost Method . . . . .	84
3.10	The Separable Costs-Remaining Benefits Method of Cost Allocation in Federal Multi-purpose Projects . . . . .	85
3.11	Limits on the Ascertainment of Costs . . . . .	87
3.12	Definitions of Cost . . . . .	89
<b>4</b>	<b>The Cost Approach to Pricing: The Tenneco Pattern . . . . .</b>	<b>93</b>
4.1	Tenneco Pattern . . . . .	93
4.2	The Issues . . . . .	94
4.3	The Regulatory Scheme in Brief . . . . .	95
4.4	Assignment of Fixed and Variable Costs . . . . .	95
4.4.1	The Seaboard Formula . . . . .	96
4.4.2	The United Formula . . . . .	100
4.4.3	The Modified Fixed–Variable (MFV) Formula . . . . .	100
4.4.4	The Straight Fixed–Variable (SFV) Formula . . . . .	103
4.4.5	Comparison of the Formulae . . . . .	104
4.5	The Demand Charge . . . . .	105
4.6	Zoning . . . . .	106
4.6.1	A “Postage-Stamp” Approach . . . . .	107
4.6.2	The Zoning Alternatives . . . . .	107
4.6.3	Which Alternative Is the Best? . . . . .	108
4.6.4	The Legal Standards . . . . .	108
4.6.5	The Commission’s Appraisal Yardsticks . . . . .	108
4.6.6	Commission Precedents . . . . .	109
4.6.7	The Commission’s Findings and Orders . . . . .	109
4.7	A Resume . . . . .	110
4.8	The Minimum Bill . . . . .	111
4.9	Tenneco Allocations for Rate Design . . . . .	112
4.9.1	Step 1: The Company-Wide Cost of Service . . . . .	112
4.9.2	Step 2: Functionalization of the Cost of Service . . . . .	113
4.9.3	Step 3: Classification of Functional Costs as Fixed or Variable . . . . .	116
4.9.4	Step 4: Classification of Costs as Demand or Commodity . . . . .	120
4.9.5	Step 5: Classification of Transmission Sector Costs . . . . .	122
4.9.6	Step 6: Distance-Related Costs . . . . .	122
4.9.7	Step 7: The New York Zone . . . . .	125
4.9.8	Step 8: Per-Unit Rate Elements . . . . .	125

4.9.9	Step 9: Total System Costs Revisited . . . . .	128
4.9.10	Closing Reminders . . . . .	130
<b>5</b>	<b>The Value Approach to Pricing: Demand Influence . . . . .</b>	<b>131</b>
5.1	Preface . . . . .	131
5.2	Value of Service Defined . . . . .	131
5.3	Cost vs. Value in Juxtaposition . . . . .	132
5.4	The “Upper and Lower Limit of Rates” Concept . . . . .	133
5.5	Economic Demand . . . . .	136
5.6	Direct and Derived Demand . . . . .	136
5.7	Option Demand . . . . .	136
5.8	The Price Elasticity of Demand . . . . .	137
5.9	The Crucial Importance of Price Elasticity . . . . .	139
5.9.1	Electric—Washington Public Power Supply System (WPPSS) . . . . .	140
5.9.2	Gas—Producer-Pipeline Take-or-Pay Contracts . . . . .	142
5.10	The Revenue Effects of Elasticity . . . . .	143
5.11	Immediate, Short-Run and Long-Run Price Elasticities of Demand . . . . .	146
5.12	Repression and Stimulation . . . . .	147
5.13	The Principle of Diminishing Utility . . . . .	148
5.14	Economics of Pricing on a Value of Service Basis . . . . .	149
5.15	Monopoly Pricing . . . . .	149
5.16	The Theory of Class Price . . . . .	151
5.16.1	Price Differentiation . . . . .	152
5.16.2	Reasonable Price Differences . . . . .	152
5.16.3	Determination of Rate Classifications Under Value and Combined Cost-Value Approaches . . . . .	155
5.16.4	Combined Value and Cost Bases . . . . .	156
5.17	Bases of Rate Classes . . . . .	157
5.18	The Cost and Value Approaches Compared . . . . .	162
5.19	Unreasonable Discrimination . . . . .	164
5.19.1	The FERC Lists . . . . .	165
5.19.2	Statutory Prohibitions . . . . .	165
5.20	Predatory Pricing . . . . .	168
5.21	Is There a Problem? . . . . .	169
5.22	Concluding Observations on Cost vs. Value . . . . .	170
5.23	Marketing and Advertising . . . . .	173
5.23.1	Civic Participation . . . . .	173
5.23.2	Marketing . . . . .	173
5.23.3	Giveaways . . . . .	174
5.23.4	Advertising . . . . .	175
<b>6</b>	<b>The Value Approach to Pricing: Planning for Demand . . . . .</b>	<b>177</b>
6.1	Units of Measurement . . . . .	177
6.2	Procedure . . . . .	178

6.3	Planning: Short-Run Demand Forecasts . . . . .	178
6.3.1	Natural Gas . . . . .	179
6.3.2	Electric . . . . .	179
6.3.3	Common Issues . . . . .	179
6.4	Planning: Long-Range Demand Forecasts . . . . .	180
6.4.1	The Purpose of the Forecast . . . . .	182
6.4.2	The Strategic Plan . . . . .	182
6.4.3	The Supply Forecast . . . . .	183
6.4.4	Matching Supply and Demand . . . . .	183
6.4.5	The Input Assumptions . . . . .	184
6.4.6	Other Market Share Considerations . . . . .	186
6.4.7	Availability and Reliability . . . . .	186
6.4.8	Finally, the Factor of Governmental Policy . . . . .	187
6.5	Final Results . . . . .	187
6.5.1	The Single Forecast vs. a Range . . . . .	188
6.5.2	The Components of the Forecast . . . . .	189
6.5.3	Testing the Forecast . . . . .	189
6.5.4	Reliance on Forecasts . . . . .	191
6.6	Public Policy Forecasts . . . . .	192
6.6.1	Errors in Public Policy . . . . .	192
6.6.2	Omissions in Public Policy . . . . .	193
6.7	Concluding Comments . . . . .	193
6.7.1	Conflicting Forecasts . . . . .	194
6.7.2	Guidelines . . . . .	194
6.7.3	A Personal Note . . . . .	195
6.7.4	Alternative Forecasts . . . . .	195
6.7.5	Resolving Forecasting Conflicts . . . . .	196
<b>7</b>	<b>The Public Policy/Social Engineering Approach to Pricing . . . . .</b>	<b>197</b>
7.1	California's Lifeline/Baseline Rate . . . . .	197
7.1.1	The California Lifeline Philosophy . . . . .	198
7.1.2	The Lifeline/Baseline Rate Schedule . . . . .	198
7.1.3	Pricing Procedure . . . . .	200
7.2	Cost Components of Rates . . . . .	202
7.3	Timed Pricing . . . . .	203
7.3.1	Prior to 2000 . . . . .	203
7.3.2	Real-Time Pricing (RTP) . . . . .	204
7.3.3	Now . . . . .	204
7.4	The Color GREEN . . . . .	205
7.4.1	Comparisons . . . . .	206
7.4.2	Electric Utilities: Clean-Energy Programs . . . . .	207
7.4.3	From the Printed Media . . . . .	207
7.5	Venture into Marginal Cost Regulation . . . . .	212
7.5.1	Marginal Cost Defined . . . . .	213
7.5.2	The Steppingstone . . . . .	213

7.5.3	The Proxy, a Combustion Turbine . . . . .	214
7.5.4	Levelization Out, RECC In . . . . .	214
7.5.5	EPMC Adopted, EDP Dropped . . . . .	214
7.5.6	Energy Reliability Index (ERI) Established . . . . .	215
7.5.7	Excess Generating Capacity and the ERI . . . . .	215
7.5.8	The Resource Plan and the ERI . . . . .	216
7.5.9	Long-Run vs. Short-Run and the ERI . . . . .	216
7.5.10	The Capacity Response Ratio (CRR) . . . . .	216
7.5.11	VOS In, ERI Out . . . . .	216
7.5.12	The Abrupt Halt . . . . .	216
7.6	Wind Rates on an Integrated Electric System . . . . .	217
7.6.1	A Primer on Wind and the Electric Grid . . . . .	217
7.6.2	Amount of Wind Generation . . . . .	219
7.6.3	Wind and Planning . . . . .	219
7.6.4	Planning: Wind Generators . . . . .	219
7.6.5	Planning: Persistence Models . . . . .	220
7.6.6	The Generation Reserves . . . . .	221
7.6.7	Costs . . . . .	222
7.6.8	Balancing Measures . . . . .	223
7.6.9	Points of Contention . . . . .	224
7.6.10	Services Offered . . . . .	224
7.6.11	Rate Design . . . . .	224
7.6.12	Physical Specifications . . . . .	227
7.6.13	What's Left Out . . . . .	227
<b>8</b>	<b>Introduction to Rates . . . . .</b>	<b>229</b>
8.1	The Unregulated Marketplace . . . . .	229
8.2	The Marketplace Under Regulation . . . . .	230
8.3	The Customer Viewpoint . . . . .	230
8.4	The Management Viewpoint . . . . .	231
8.5	The Public Viewpoint . . . . .	232
8.5.1	The California PUC . . . . .	233
8.5.2	The Federal Energy Regulatory Commission . . . . .	234
8.6	Related Objectives . . . . .	236
8.7	Some Expert Opinions . . . . .	236
8.8	Definitions . . . . .	237
<b>9</b>	<b>Elements of Rate Design . . . . .</b>	<b>241</b>
9.1	Frequent Features . . . . .	241
9.1.1	Minimums . . . . .	241
9.1.2	Ratchets . . . . .	243
9.1.3	Adjustment Clauses . . . . .	244
9.1.4	Penalties and Discounts . . . . .	245
9.1.5	"Frozen" Rates . . . . .	246
9.1.6	Caps and Floors . . . . .	246
9.2	The "Blocking" Principle . . . . .	247
9.3	"Postage Stamp" vs. Zone Rates . . . . .	250

9.4	All-Purpose vs. Special-Purpose Rates: Unbundling . . . . .	252
9.5	Seasonal vs. Year-Round Rates . . . . .	254
9.6	Rolled-in vs. Incremental Pricing/Old Customer vs. New Customer Rates . . . . .	254
9.7	Rate-Level Changes Across-the-Board . . . . .	257
9.8	The “Fine-Print” Provisions . . . . .	259
9.9	Nota Bene . . . . .	260
<b>10</b>	<b>Traditional Types of Rate Forms . . . . .</b>	<b>261</b>
10.1	Introduction . . . . .	261
10.2	Rate Elements Defined Again . . . . .	262
10.3	Single-Part Rate Forms . . . . .	262
10.3.1	Flat Rates . . . . .	262
10.3.2	Metered Commodity Rates (Also Called Straight-Line Commodity Rates) . . . . .	264
10.3.3	Metered Demand Rates . . . . .	265
10.3.4	Single-Part Rate Forms and Rate Theory . . . . .	266
10.4	Two-Part Rate Forms . . . . .	272
10.4.1	The Hopkinson Rate . . . . .	272
10.4.2	The Wright Rate . . . . .	279
10.4.3	Comparison of Hopkinson and Wright Rate Forms . . . . .	281
10.4.4	Two-Part Rate Forms and Rate Theory . . . . .	282
10.5	Three-Part Rate Forms . . . . .	287
10.5.1	The Doherty Three-Part Rate . . . . .	287
10.5.2	The Lester Special-Investment Three-Part Rate . . . . .	288
10.5.3	The Zanoff Three-Part Gas Pipeline Rate . . . . .	289
10.6	Modifications of Rate Forms and Special Applications . . . . .	290
10.6.1	Promotional, Incentive-Type Rates . . . . .	290
10.6.2	The Objective Rate . . . . .	290
10.6.3	Additions to Standard Rate Forms . . . . .	291
10.7	Miscellany . . . . .	292
10.7.1	A 1946–1950 Case History with Overtones for Today . . . . .	292
10.7.2	Rate Forms and Rate Comparisons . . . . .	294
10.7.3	A 1971 Gas Distributor and Pipeline Tariff . . . . .	295
10.7.4	Some Concluding Observations . . . . .	299
<b>11</b>	<b>Tools of the Trade . . . . .</b>	<b>301</b>
11.1	Introduction . . . . .	301
11.2	Knowing the Market: Load Curves . . . . .	302
11.2.1	Load/Demand Curve . . . . .	302
11.2.2	Season Usage Patterns . . . . .	303
11.2.3	Duration Curve . . . . .	305
11.2.4	Planning . . . . .	306
11.3	Gauging the Market: Analysis Factors . . . . .	308
11.3.1	Diversity and Diversity Factor . . . . .	309
11.3.2	Load Factor . . . . .	315

11.4	Capacity Factor . . . . .	321
11.5	Utilization Factor . . . . .	322
11.6	Demand Factor . . . . .	322
11.7	Power Factor . . . . .	323
11.8	A Note to the Rate maker . . . . .	324
<b>12</b>	<b>Matters of Judgment . . . . .</b>	<b>325</b>
12.1	Part 1: Dubious Accounting . . . . .	326
12.2	Earlier Accounting Results . . . . .	326
12.3	Current Accounting Results . . . . .	327
12.3.1	Overstatements . . . . .	328
12.3.2	Understatements . . . . .	328
12.3.3	Special Issues . . . . .	329
12.3.4	Potpourri . . . . .	330
12.3.5	Three Tidbits over 10 Years . . . . .	331
12.3.6	Debt Concealment . . . . .	332
12.3.7	At the Borderline . . . . .	332
12.4	An Appraisal . . . . .	333
12.5	Difference: Utility and General Corporate Accounting . . . . .	333
12.5.1	Lack of Uniformity . . . . .	334
12.5.2	The Question of Prudence . . . . .	336
12.5.3	AFUDC . . . . .	337
12.5.4	Deferred Income Taxes . . . . .	338
12.6	Part 2: The California Energy Crisis . . . . .	339
12.7	1996: Assembly Bill 1890 . . . . .	340
12.8	Optimism Reigns: No Doubts (1996) . . . . .	341
12.9	The Lull Before the Storm (1997–1999) . . . . .	342
12.9.1	FERC's Approval . . . . .	343
12.9.2	Sales of California Generation Capacity . . . . .	343
12.9.3	The California PX . . . . .	344
12.9.4	Acquisitions of Generating Capacity Beyond California . . . . .	345
12.9.5	Other Notes of the Majors . . . . .	347
12.9.6	Rate Reduction Bonds . . . . .	348
12.10	The Storm Hits: The Energy Crisis (2000–2001) . . . . .	348
12.10.1	PG&E Corporation and Edison International . . . . .	349
12.10.2	Other Activities of PG&E Corporation and Edison International . . . . .	352
12.10.3	The Special Case of Sempra Energy, Parent of San Diego Gas and Electric Company . . . . .	354
12.11	Chronology: The Crisis and Its Aftermath (to Early 2002) . . . . .	356
12.11.1	November 1999 . . . . .	357
12.11.2	August 2000 . . . . .	357
12.11.3	January 2001 . . . . .	361
12.11.4	February 2002 . . . . .	382

12.12	Comments . . . . .	389
12.12.1	The Fatal Contradiction . . . . .	389
12.12.2	Regulatory and Economic Failures . . . . .	390
12.12.3	The Divestiture of Generating Capacity by California Utilities . . . . .	391
12.12.4	The Issue of Long-Term Contracts . . . . .	392
12.12.5	The Uniform-Price Auction . . . . .	393
12.12.6	The Neglect of Costs . . . . .	393
12.13	From Storm to Turmoil . . . . .	394
12.14	P.S. – 2009 . . . . .	394
12.14.1	Pacific Gas and Electric Company . . . . .	394
12.14.2	Edison International . . . . .	395
12.14.3	Sempra Energy . . . . .	396
12.14.4	Statutory Changes . . . . .	396
12.14.5	CPUC Actions . . . . .	396
12.15	Part 3: The 2008–2009 Recession . . . . .	397
12.16	Toxic Assets in Action: The Beginning . . . . .	398
12.16.1	The Securitization Process in Detail . . . . .	398
12.16.2	The CDS . . . . .	399
12.16.3	The CMBS . . . . .	399
12.16.4	A Bond Called Jupiter . . . . .	400
12.17	Disregarded History . . . . .	400
12.18	Earlier Bailouts . . . . .	400
12.19	The Financial Crisis . . . . .	400
12.20	The Bailouts . . . . .	401
12.21	A Conducive Environment . . . . .	402
12.22	Causes . . . . .	403
12.23	The Dow from September 10 to October 10, 2008 . . . . .	404
12.24	The Paths of the Giants . . . . .	404
12.25	Regulation . . . . .	404
12.26	2008 Statistics . . . . .	405
12.27	Epilogue . . . . .	406
12.28	Acronyms and Definitions . . . . .	406
<b>Index</b>	. . . . .	<b>407</b>



<http://www.springer.com/978-3-642-15490-4>

Energy Pricing

Economics and Principles

Conkling, R.L.

2011, XXIV, 412 p., Hardcover

ISBN: 978-3-642-15490-4