Cost of Service Study and Rate Design Options

Steuben County REMC
Board Presentation
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Presentation Topic Overview

1. Ratemaking Process Overview
2. Revenue Requirement Study Results
3. Fundamentals of Cost of Service
4. Cost of Service Study Results
5. Rate Design Implementation Options

Ratemaking Process Overview

Ratemaking Steps

Revenue Requirement
(How Much?)

- **Suggests Operating Revenue & Patronage Capital to Meet Prudent (1) Operating Expenses; and (2) Financial Goals (Debt Service, Margins, Equity Levels, Plant Additions & Patronage Capital Retirement)**

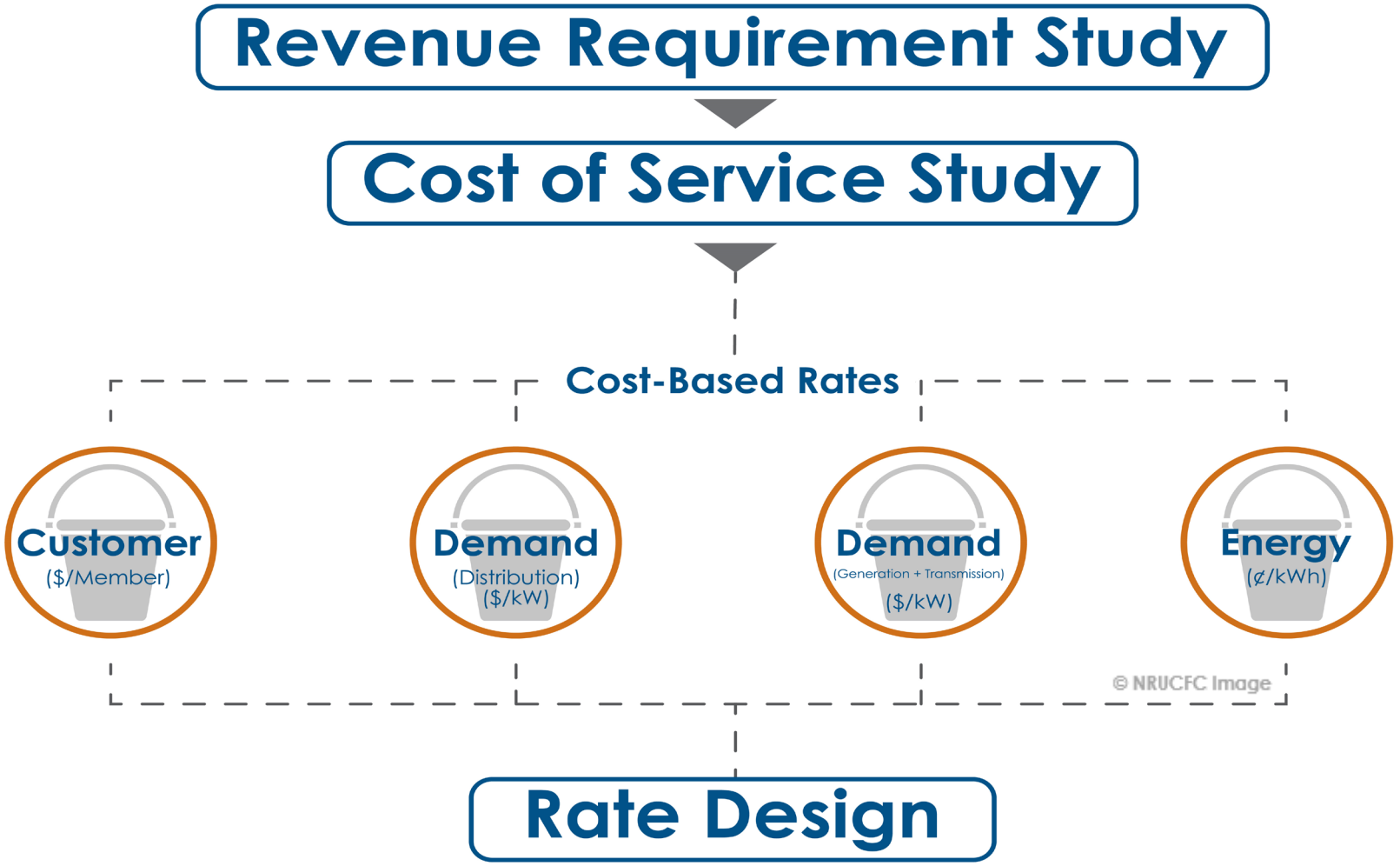
Cost of Service
(From Whom?)

- **Analysis to evaluate and allocate the costs of providing utility service among different service classes**
  - Identifies Cost to Serve Each Rate Classification (Cost Causation)
  - Identifies Existing Subsidies (and Magnitude) Between Rate Classifications
  - Identifies Cost-Based (Unit-Based) Rate Structure

Rate Design
(How?)

- **Revenues to Collect from Each Rate Classification**
- **Cost of Service Guides Rate Design by Aligning Costs & Revenue Collection**
- **Cost of Service Provides Insights to More Precisely Apply Rate Increase/ Rate Re-Design to Align with Rate Policy**

From Numbers to Rates



Revenue Requirement Study Results

Revenue Requirement

Revenue Requirement = **Operating Expenses** + **Rate of Return on Rate Base** × **Rate Base**

Total Operating Revenue & Patronage Capital

Operating Income/ Margins

Consolidated Revenue Requirement Study - General Findings

2024 – Historic	2024 – Adjusted	2024 – ROR Model
$30,201,486 Op. Rev/Pat. Cap $3,488,681 Operating Income $1,614,842 Operating Margins	$32,830,563 Op. Rev/Pat. Cap $3,972,641 Operating Income $1,640,281 Operating Margins	$32,469,329 Op. Rev/Pat. Cap $3,611,407 Operating Income $1,279,047 Operating Margins
1.89 Operating TIER 2.18 MDSC 5.57% Return on Rate Base 8.49% Return on Equity	1.72 Operating TIER 2.43 MDSC 6.47% Return on Rate Base 9.26% Return on Equity	1.57 Operating TIER 2.32 MDSC 5.88% Return on Rate Base 7.58% Return on Equity

Consolidated Revenue Requirement Study – Summary

Consolidated Revenue Requirements Study Summary (Rate of Return Method)

		(a) 2021 Historic	(b) 2022 Historic	(c) 2023 Historic	(d) 2024 Historic	(e) 2024 Adjusted	(f) 2024 ROR Rate Decrease
1	Rate Base	$ 25,420,707	$ 36,215,661	$ 59,851,595	$ 62,666,771	$ 61,403,346	$ 61,403,346
2	Return on Rate Base (ROR)	4.03%	2.67%	1.95%	5.57%	6.47%	5.88%
3	(Margins) Operating Income (Line 1 * Line 2)	$ 1,024,142	$ 967,532	$ 1,167,990	$ 3,488,681	$ 3,972,641	$ 3,611,407
4	Operating Expenses	$ 21,983,749	$ 23,335,887	$ 25,145,875	$ 26,712,805	$ 28,857,922	$ 28,857,922
5	Revenue Requirement (Line 3 + Line 4)	$ 23,007,891	$ 24,303,419	$ 26,313,865	$ 30,201,486	$ 32,830,563	$ 32,469,329
6	2024 Electric Revenue				$ 25,953,259	$ 28,582,336	$ 28,582,336
7	2024 PCA Revenue				$ -	$ -	
8	2024 Misc. Revenue				$ 4,248,227	$ 4,248,227	$ 4,248,227
9	Total Operating Revenue & Patronage Capital (SUM Lines 6-8)	$ 23,007,891	$ 24,303,419	$ 26,313,865	$ 30,201,486	$ 32,830,563	$ 32,830,563
10	Revenue Increase / (Decrease) (Line 5 - Line 9)						$ (361,234)
11	% Increase in Operating Revenue & Patronage Capital (Line 10 / Line 9)						-1.10%
12	% Increase in Electric Revenue (Line 10 / Line 6)						-1.26%
13	Return on Equity (ROE)	4.16%	3.03%	1.80%	8.49%	9.26%	7.58%
14	Operating TIER	2.20	2.05	1.41	1.89	1.72	1.57
15	Net TIER	3.97	2.57	2.30	2.45	2.17	2.02
16	MDSC	2.82	2.14	1.71	2.18	2.43	2.32
17	DSC	3.37	2.44	1.73	2.19	2.45	2.34
18	ODSC	2.44	2.19	1.36	1.87	2.13	2.01

Fundamentals of Cost of Service

Objectives of Cost-of-Service Studies

Cost Causation

- Individual rate class revenue requirement or "cost to serve"
- Investment & operating expenses incurred by rate class

Equity & Fairness

- Identifies inter-rate class subsidies
- Identifies potential inequities between & within rate classes

Improve Price Signals

Cost Recovery

- Customer-related
- Demand-related
- Energy-related

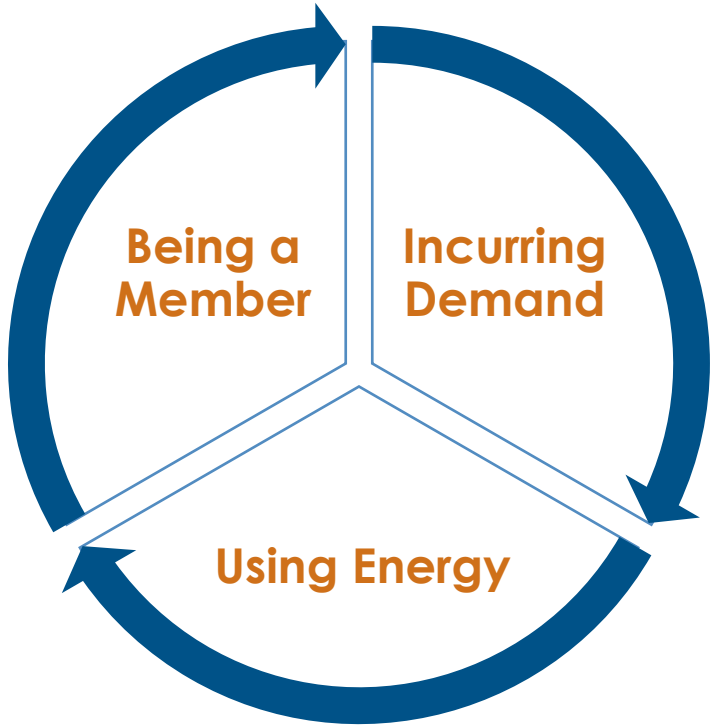
** Provides a reasonable guide for identifying average cost responsibility of consumers within a class; results cannot be used to identify the specific cost of providing service to an individual consumer; allocating costs is subject to numerous assumptions, philosophies, and methodologies.

Cost of Service Study (From Whom?)

A process which assigns costs to the classes of members to determine who incurred the costs.

Cost Causation

How are costs incurred on an electric system?



Costs are incurred by:

- Being a member-customer (Connectivity to Grid)
- By incurring demand (kW) (Distribution & Purchased Power)
- By using energy

Utility Tariffs Do Not Reflect Utility Cost Structures

Cost Categories	Cost Based or Policy	Actual Bill
Fixed ($/Customer): • Metering & Billing • Customer Service • Meter & Service Drop • Portion of Distribution System for Connectivity (No Load)	Fixed = $60	Fixed = $35
Capacity-Related (Demand) (kW) Distribution System: • Distribution Capacity • Portion of Distribution System Sized to Meet Peak Loads	Demand = $25	
Capacity-Related (Demand) (kW) Generation/Purchased Power: • Transmission Capacity • Generation Capacity • Sized to Meet Peak Loads	Demand = $100	
Variable (Energy) (kWh): • Fuel • Operations & Maintenance	Variable = $40	Variable = $190

*Illustrative Example Only, Total Bill ($225) Based on Typical Residential Usage

Interpreting Cost of Service Results

Rate Realignment

- Subsidy exists when there is a difference between the current rate revenue collected and identified cost of service
- Subsidy can be positive or negative
- Not uncommon to experience commercial and/or industrial members paying more and residential members paying less

Policy Considerations

- Determined by cooperative's objectives, goals & rate policy (and State Commission, if applicable)
  - Who provides and receives subsidy (if any)?
  - What is the degree & magnitude of the subsidy?
  - Rate design & rate increases/decreases applied to modify subsidies out of alignment with rate policy goals rather than apply rate increase equally to all rates.
  - What is fair & equitable is in the eye of the beholder
- Subsidies may send incorrect economic signal
- Commercial and/or industrial rates set above cost of service can have negative effect on their ability to compete
- Many State Commissions will require uniform rate increases rather than eliminate/correct subsidies

Cost of Service Study Results

Cost of Service General Findings

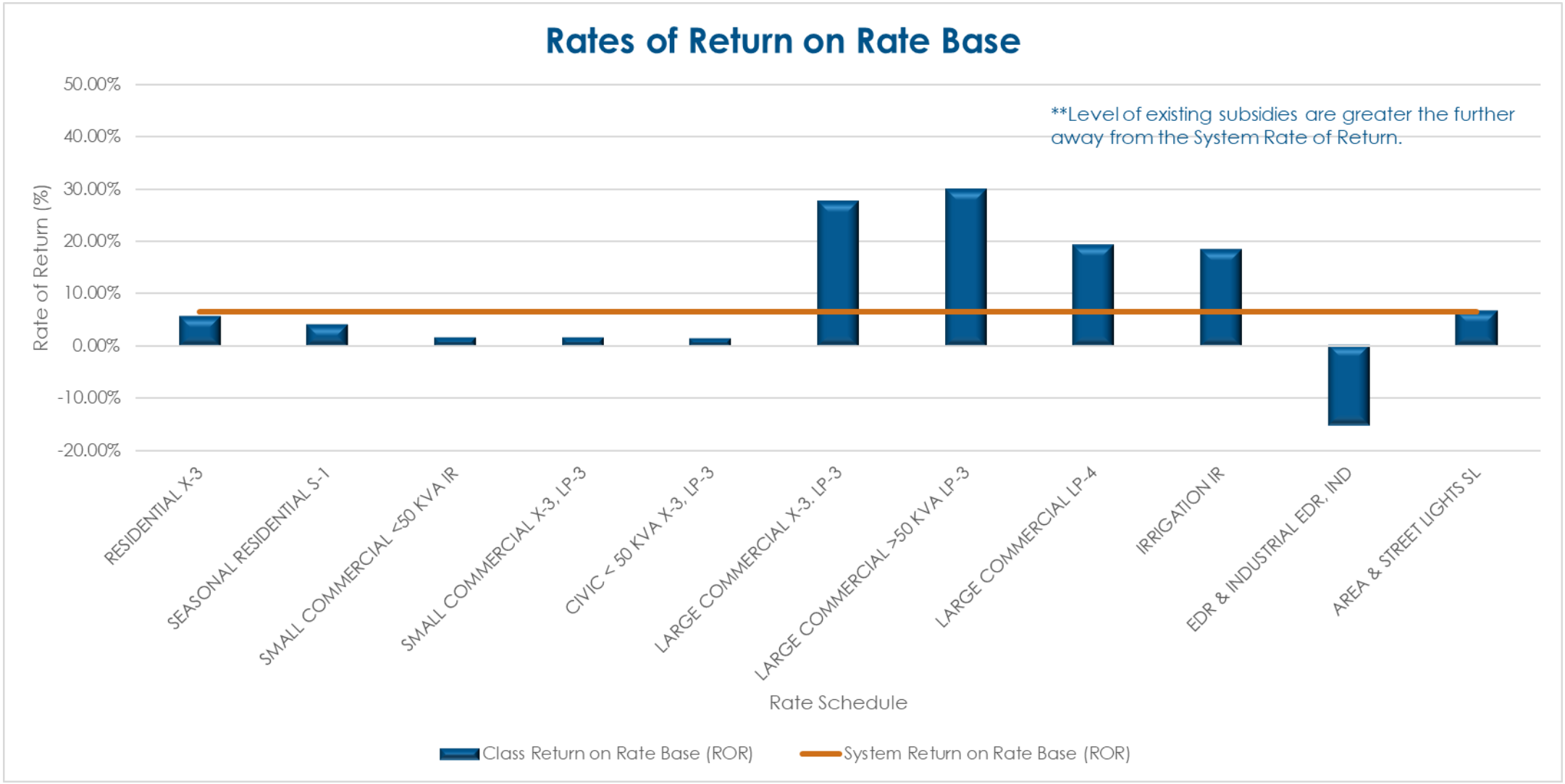
- Revenue Parity with Cost of Service
  - Residential, Area & Street Lights
- Revenue Below Cost of Service (Receiving Subsidy)
  - Seasonal Residential, Civic < 50 KVA, Small Commercial, Small Commercial < 50 KVA, EDR & Industrial
- Revenue Above Cost of Service (Providing Subsidy)
  - Large Commercial, Large Commercial > 50 KVA, Large Commercial LP-4, Irrigation

Cost of Service Study – Revenue Comparison

Comparison Between Adjusted COSS Allocation and Existing Revenue

Line No.	Class	Cost of Service Revenue Allocation	Existing Revenue Collection	Difference	Percent Difference	Existing Return on Rate Base
1	RESIDENTIAL X-3	$ 10,698,380	$ 10,330,979	$ 367,401	3.56%	5.46%
2	SEASONAL RESIDENTIAL S-1	$ 1,711,568	$ 1,495,616	$ 215,952	14.44%	3.83%
3	SMALL COMMERCIAL <50 KVA IR	$ 772,265	$ 661,802	$ 110,463	16.69%	1.41%
4	SMALL COMMERCIAL X-3, LP-3	$ 7,660	$ 6,560	$ 1,100	16.77%	1.41%
5	CIVIC < 50 KVA X-3, LP-3	$ 133,568	$ 118,014	$ 15,554	13.18%	1.30%
6	LARGE COMMERCIAL X-3. LP-3	$ 89,772	$ 118,948	$ (29,176)	-24.53%	27.39%
7	LARGE COMMERCIAL >50 KVA LP-3	$ 1,864,806	$ 2,434,048	$ (569,242)	-23.39%	29.77%
8	LARGE COMMERCIAL LP-4	$ 5,101,255	$ 5,880,496	$ (779,241)	-13.25%	19.18%
9	IRRIGATION IR	$ 155,191	$ 202,565	$ (47,374)	-23.39%	18.28%
10	EDR & INDUSTRIAL EDR, IND	$ 3,611,565	$ 2,897,282	$ 714,283	24.65%	-15.12%
11	AREA & STREET LIGHTS SL	$ 259,493	$ 259,213	$ 280	0.11%	6.46%
12	Electric Revenues	$ 24,405,523	$ 24,405,523	$ 0		
13	PCA Revenues	$ 4,176,813	$ 4,176,813	--		
14	Misc. Revenues	$ 4,248,227	$ 4,248,227	--		
15	Operating Revenue & Patronage Capital	$ 32,830,563	$ 32,830,563	$ 0	0.00%	
16	System Return on Rate Base					6.47%

Rates of Return Comparison



Cost-Based Rates

Adjusted Cost of Service Study Cost-Based Rates

Line No.	Class	Distribution Customer Related (Member/Month)	Distribution Demand Related (per NCP kW)	Power Supply Demand Related (per CP kW)	Power Supply Energy Related (per kWh)
1	RESIDENTIAL X-3	$ 39.87	$ 8.25	$ 20.25	$ 0.02965
2	SEASONAL RESIDENTIAL S-1	$ 37.12	$ 8.25	$ 20.25	$ 0.02947
3	SMALL COMMERCIAL <50 KVA IR	$ 43.56	$ 8.25	$ 20.25	$ 0.02950
4	SMALL COMMERCIAL X-3, LP-3	$ 43.53	$ 8.25	$ 20.25	$ 0.02913
5	CIVIC < 50 KVA X-3, LP-3	$ 50.29	$ 8.25	$ 20.25	$ 0.02951
6	LARGE COMMERCIAL X-3. LP-3	$ 80.24	$ 8.17	$ 20.06	$ 0.02680
7	LARGE COMMERCIAL >50 KVA LP-3	$ 163.85	$ 8.17	$ 20.06	$ 0.02907
8	LARGE COMMERCIAL LP-4	$ 2,221.74	$ 8.17	$ 20.06	$ 0.02902
9	IRRIGATION IR	$ 45.89	$ 8.25	$ 20.25	$ 0.02837
10	EDR & INDUSTRIAL EDR, IND	$ 7,205.97	$ 8.09	$ 19.86	$ 0.05164
11	AREA & STREET LIGHTS SL	$ 11.48	$ -	$ -	$ -

*** Cost-Based Rates are not rate design recommendations, nor are they intended to be directly implemented as a rate design. Cost-Based Rates illustrate the per unit cost-of-service from a cost causation (cost per unit) perspective, notwithstanding existing policies. Rate design is driven by cost causation, policy, member acceptance, etc.

Cost-Based Rates with Broadband

Adjusted Cost of Service Study Cost-Based Rates with Broadband

Line No.	Class	Distribution Customer Related (Member/Month)	Distribution Demand Related (per NCP kW)	Power Supply Demand Related (per CP kW)	Power Supply Energy Related (per kWh)
1	RESIDENTIAL X-3	$ 71.79	$ 8.25	$ 20.25	$ 0.02965
2	SEASONAL RESIDENTIAL S-1	$ 69.04	$ 8.25	$ 20.25	$ 0.02947
3	SMALL COMMERCIAL <50 KVA IR	$ 75.48	$ 8.25	$ 20.25	$ 0.02950
4	SMALL COMMERCIAL X-3, LP-3	$ 75.45	$ 8.25	$ 20.25	$ 0.02913
5	CIVIC < 50 KVA X-3, LP-3	$ 82.21	$ 8.25	$ 20.25	$ 0.02951
6	LARGE COMMERCIAL X-3. LP-3	$ 112.16	$ 8.17	$ 20.06	$ 0.02680
7	LARGE COMMERCIAL >50 KVA LP-3	$ 195.77	$ 8.17	$ 20.06	$ 0.02907
8	LARGE COMMERCIAL LP-4	$ 2,253.66	$ 8.17	$ 20.06	$ 0.02902
9	IRRIGATION IR	$ 77.81	$ 8.25	$ 20.25	$ 0.02837
10	EDR & INDUSTRIAL EDR, IND	$ 7,333.63	$ 8.09	$ 19.86	$ 0.05164
11	AREA & STREET LIGHTS SL	$ 19.46	$ -	$ -	$ -

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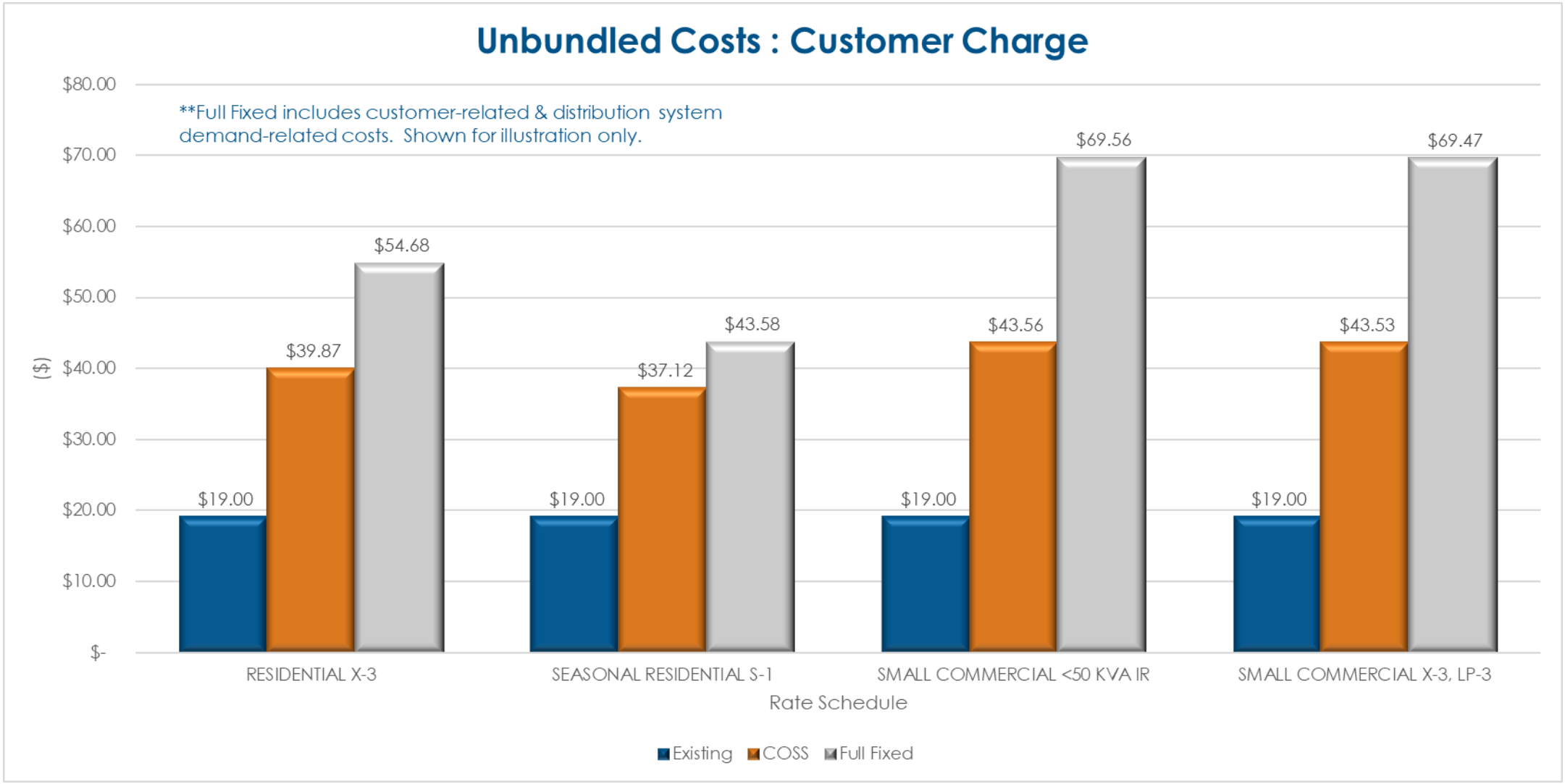
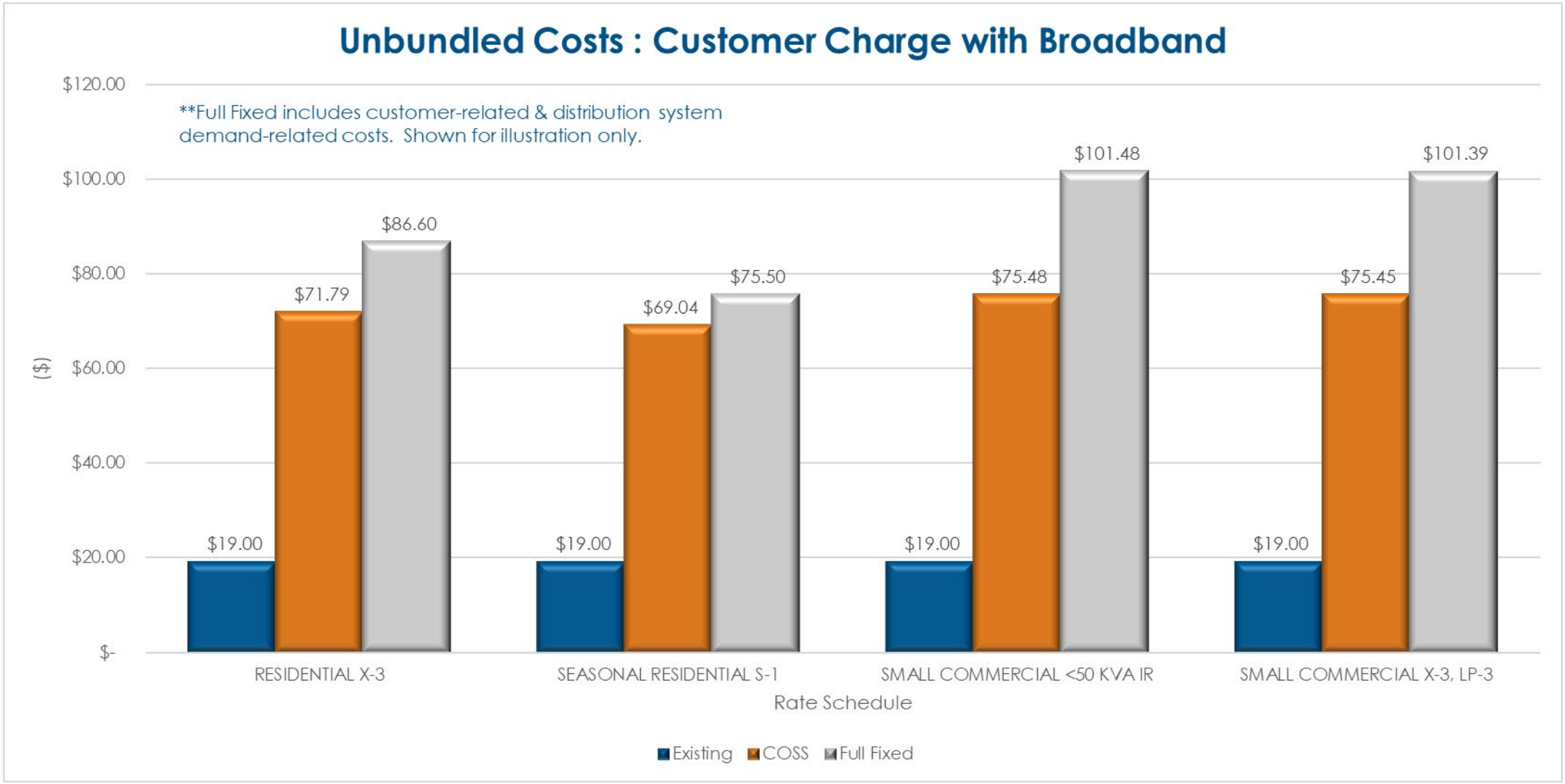
Unbundled Costs Comparison



Unbundled Costs Comparison with Broadband



Rate Design Implementation Options

Rate Design Insights & Recommendations

- Modeling Indicates Sufficient Overall Revenue Collection
  - The COSS results show that EDR and Industrial members are receiving significant subsidy
  - Customer charges for some of the rate classes can be adjusted to recover more of the customer-related costs

- Proposed Rate Design: Transfer PCA revenues into base rates
  - Scenario 1: Test Year PCA revenues were moved into the base energy charge for Residential, Residential Seasonal, Large Commercial and Irrigation rates
  - Scenario 2: Test Year PCA revenues were moved into the facilities charge and base energy charge for Residential and Residential Seasonal, and base energy charge for Large Commercial and Irrigation rates

Rate Design Scenarios (X-3 and S-1)

Uniform Single Phase (Rate Schedule X-3)

	Existing	Proposed Scenario 1	Proposed Scenario 2
Facilities Charge	$19.00	$19.00	$25.00
Energy Charge			
First 250 kWh	$0.099000	$0.125860	$0.117137
Next 750 kWh	$0.091000	$0.115690	$0.107671
Over 1000 kwh	$0.083000	$0.105519	$0.098206
PCA	$0.024380	$0.000000	$0.000000

Seasonal Residential Service (Rate Schedule S-1)

	Existing	Proposed Scenario 1	Proposed Scenario 2
Facilities Charge	$19.00	$19.00	$25.00
Energy Charge			
First 250 kWh	$0.099000	$0.125860	$0.117137
Next 750 kWh	$0.091000	$0.115690	$0.107671
Over 1000 kwh	$0.083000	$0.105519	$0.098206
PCA	$0.024380	$0.000000	$0.000000

Rate Design for Consideration

- Revenue Neutral Adjustment
- Include Test Year PCA Revenue in Energy Charge for each rate schedule
- PCA Revenue: $2.2 million moved to base rates

Rate Design Scenarios (IR, LP-3 and LP-4)

Electric Irrigation Service (Rate Schedule IR)

	Existing	Proposed Scenario 1	Proposed Scenario 2
Facilities Charge	$70.00	$70.00	$70.00
Demand Charge (Max kW-Mo.)	$13.20	$13.20	$13.20
Load management credit	($7.80)	($7.80)	-$7.80
Energy Charge	$0.052400	$0.076780	$0.076780
PCA	$0.024380	$0.000000	$0.000000

Large Commercial Service (Rate Schedule LP-3)

	Existing	Proposed Scenario 1	Proposed Scenario 2
Facilities Charge	$70.00	$70.00	$70.00
Demand Charge (Max kW-Mo.)	$8.15	$8.15	$8.15
Energy Charge	$0.064000	$0.088380	$0.088380
PCA	$0.024380	$0.000000	$0.000000

Large Commercial Service (Rate Schedule LP-4)

	Existing	Proposed Scenario 1	Proposed Scenario 2
Facilities Charge	$500.00	$500.00	$500.00
Demand Charge			
Per kW NCP Billing Demand	$4.80	$4.80	$4.80
Per kW CP Billing Demand	$13.50	$13.50	$13.50
Energy Charge	$0.054000	$0.078380	$0.078380
PCA	$0.024380	$0.000000	$0.000000

Rate Increase for Consideration

- Revenue Neutral Adjustment
- Include Test Year PCA Revenue in Energy Charge for each rate schedule
- PCA Revenues moved to base rates
  - IR: $29k
  - LP-3: $550k
  - LP-4: $1.4m

Rate Design Implementation

So You've Decided to Redesign Rates

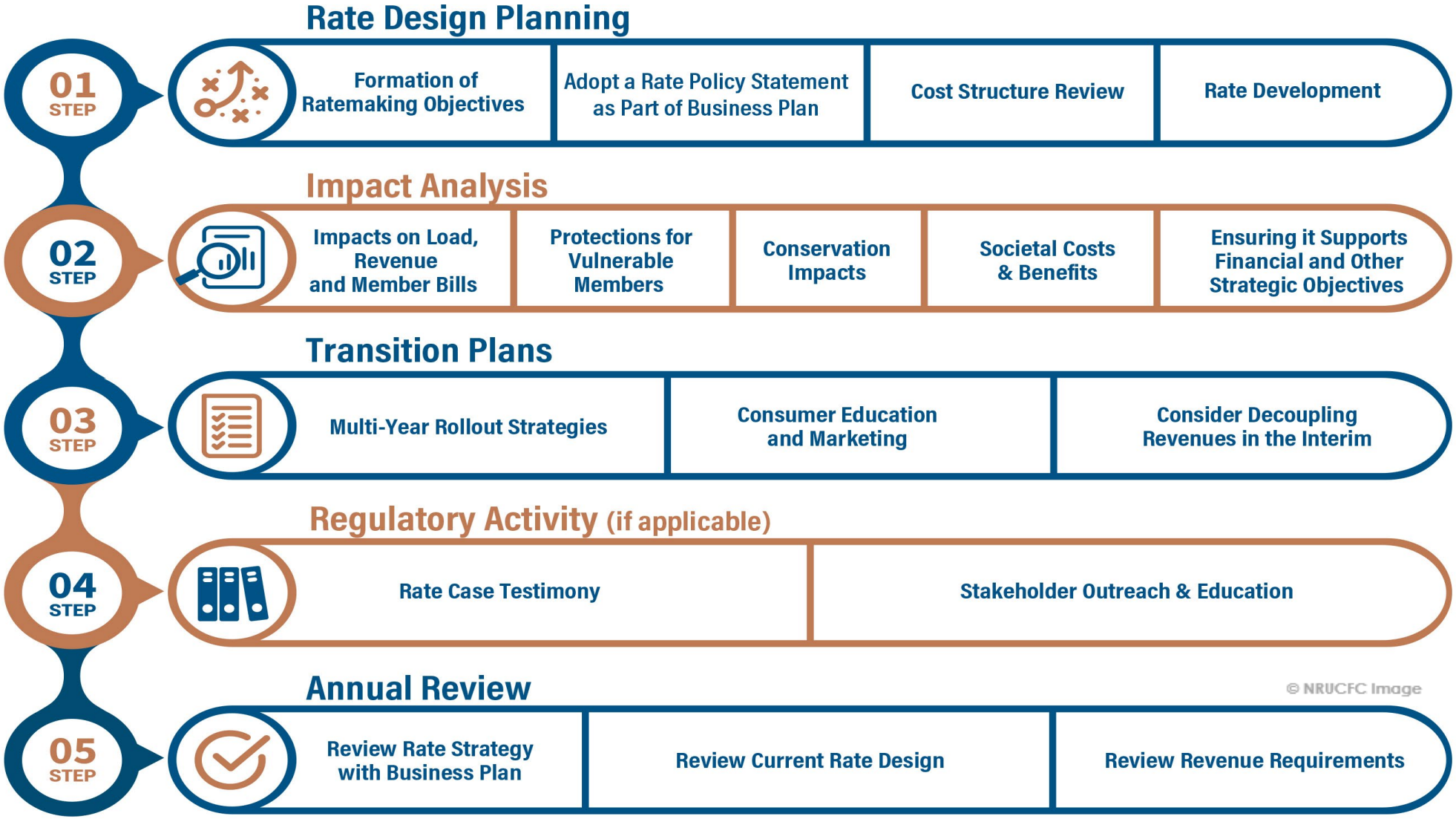
Option 1

- The change is made "overnight"
- "Members will figure it out"

Option 2

- Phased-In
- Pre-emptive Education & Marketing
- Impact Analysis & Quantitative Research

Evaluating Rate Design



Next Steps

Recommendations

Near-Term

- Review Rate Study Results and the Rate Design Scenarios
- Consider incorporating PCA revenues into base rates

Longer-Term

- Modifications to Existing Subsidization through future rate increases and/or rate design
- Improve the rate schedules and rate codes classifications in the system

General/Ongoing

- Annual Revenue Requirement Study
- Conduct Cost of Service Study every 5-7 years
  - Unless:
    - Large Load coming on/off
    - Change in G&T Rate Structure
    - Addition/Elimination of Rate Schedules
    - Rate Redesign
    - Hourly AMI
    - Due Diligence

Additional Information

Ratemaking Resources

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CFC News | October 5, 2020

CFC Helps Members Adjust to Changing Climate of Rate Design

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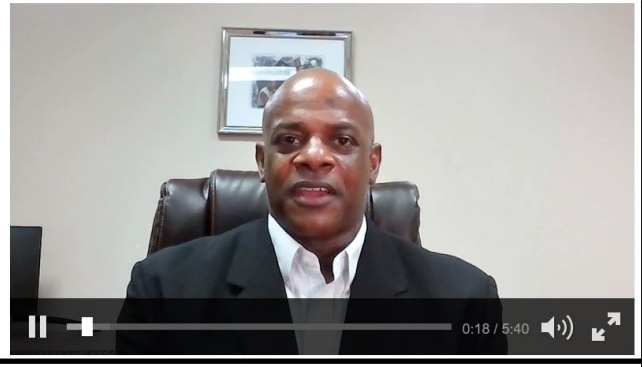
Co-op News | March 8, 2021

CFC Helps Roanoke EC Launch New EV Subscription Rate Program



CFC SOLUTIONS News Bulletin

Co-op News January 11, 2021

CFC Helps Cobb EMC Offer Multiple Rate Options to Members

Utility Pricing, Policy & Analytics Consulting Services

Rate Services

- Policy & Strategy
- Revenue Requirements
- Formulary Rates
- Rate of Return/Cost of Capital
- Cost of Service (Distribution & G&T) (Embedded & Marginal)
- Retail Rate Design (Customer Charges, TOU, Demand, EV, Subscription Pricing Models, Contracts)
- Wholesale Rate Design
- Transmission Wheeling
- Purchase Power Cost Adjustment Riders
- Line Extension & Pole Attachment
- Lighting

Regulatory Services

- Tariff/Contract Review & Development
- Interconnection/Facilities Agreements
- Rate & Regulatory Planning/ Prudence Review
- PURPA
- Avoided/Stranded Cost/ Net Metering
- Market Power Analysis
- FERC Filing Submission
- State Commission Filing Submission
- Legislative/Regulatory Comment Submission (State/Federal)
- Data Analytics/Predictive Modeling/Load Forecasting/ Weather Normalization

Litigation Support/ Expert Testimony

- Policy & Strategy
- Rate of Return/Cost of Capital
- Patronage Capital/ Member Equity
- Test Year Development
- Pro Forma/Normalization Adjustments
- Regulatory Accounting
- Revenue Requirements
- Cost of Service (Distribution & G&T) (Embedded & Marginal)
- Rate Design (Retail & Wholesale)
- PURPA
- Avoided/Stranded Cost/ Net Metering

Accounting & Tax Services

- Regulatory Accounting
- Tax Guidance
- FASB, RUS, IASB, FERC
- Uniform System of Accounts
- Plant Accounting
- Technical Support

Presentations & Training

- Executive Teams & Board of Directors
- Forum & IBES
- State-Wide Workshops
- Annual Meetings
- Industry Conferences
- CFPC Course
- Financial & Director Workshops
- New Director, CFO, CEO Roundtables

Presenter Information

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Helen Marshall is a Senior Rate & Business Consultant with the Utility Pricing, Policy & Analytics Team at the National Rural Utilities Cooperative Finance Corporation (NRUCFC or CFC). Helen conducts revenue requirement and cost of service studies and assists with rate design for CFC members.

Prior to joining CFC, Helen was a Principal Rate Analyst at Florida Power & Light (FPL), responsible for line loss and separation studies, cable and telecom pole attachment rates, and monthly wholesale profit/loss tracking. Before her employment with FPL, Helen was a Regulatory Consultant Principal at American Electric Power (AEP). She developed rates and presented testimony for the annual renewable portfolio standard and energy efficiency program filings, and prepared monthly deliverables such as demand and energy studies for multi-jurisdictional utilities, special contract bill verification and discount tracking, and renewable portfolio incremental cost calculations. Previously, Helen's career included various positions in the utility industry, including utility expense management, competitive supplier market strategy, state utility regulation and econometric forecasting.

Helen holds a Master of Arts in Public Policy & Management from The Ohio State University, a Master of Arts in Secondary Math Education from Chatham University, and a Master of Science and Bachelor of Science in Mineral Economics from The Pennsylvania State University.

Questions…

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Regulatory Advisory | Rate Design Consulting Service Requests
Email: UtilityRateDesign@nrucfc.coop

National Rural Utilities Cooperative Finance Corporation

Created and Owned by America's Electric Cooperative Network