Rate Design: What New, What's Right for You

International consulting firm providing cost of service, financial plans and financial services to utilities

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Development of rate plans, rate strategies and rate transition plans are important to a utilities future financial stability and customer's satisfaction

Ideal Cost Based Rate Structure

Cost Based Rate Design	Customer Rates	Billing Unit
Production Demand Coincident with System Peak	$12.72	KW
Distribution Based on Customers Maximum Demand	2.19	KW
Energy Charge - On Peak	0.0462	kWh
Energy Charge - Off Peak	0.0423	kWh
Customer Charge	21.44	Month
PILOT	XX%	Percent of Revenues

Ideal cost based rates are not political reality! At least not now

Utility Rate Design Objective Considerations

- Fairness to Customers
- Promote Economic Development
- Community Social Objectives:
  - Impacts on Low Income Users
- Environmental Objectives
- Maintain Financial Stability of Utility
- Stable rates for customers
- Provide customers greater control over rates

Objectives often Conflict

- Demand charges:
  - Discourage residential roof top solar installations
  - Improves the cost effectiveness for battery installations
- Rate Simplicity may discourage:
  - Demand Charges?
  - Time of Use?
- Rates encouraging roof top solar may discourage electric vehicles

Utility Responses & Trends

- Demand Charges – AMI required
- Time of Use Rates – AMI required
- Customer charges
- Grid access fees
- Inverted block rate structure differentials are being minimized
- Offering green energy rates to customers
- Low Income assistance programs
- Movement away from net metering for customer installed renewables

PG&E Rate Reform Proposal

- **Simplify rates and bring them closer to actual costs**
- **Spread the cost of essential infrastructure** maintenance and modernization more equitably to customers
- **Support informed customer choice**
  - Introduce an optional new time-of-use rate with no tiers.
  - Undertake customer education to help users find their best rate plan and manage the transition

PGE Rate Transition Plan

https://www.pge.com/en_US/residential/rate-plans/how-rates-work/rate-changes/residential-rate-changes/residential-rate-changes.page

2015	2016	2017	2018	2019-2020
Tier Price Adjustment Minimum Bill Increase	New Time-of-Use Rate Options FERA Monthly Fixed Discount Tiers Consolidated from 4 to 3 Tier Price Adjustment Minimum Bill Methodology Change	Tiers Consolidated from 3 to 2 High Usage Surcharge Tier Price Adjustment	Tier Price Adjustment	Transition Most Residential Customers to Time-of-Use Rates

- FERA Family Electric Rate Assistance – Qualified low income program

Residential Time of Use

- Pacific Gas and Electric
- SMUD
- Southern California Edison
- Duke Energy
- El Paso Electric
- CLECO
- Florida Power and Light
- Consumers Energy
- Detroit Edison

- This is only a small sampling, utilities are moving to offer time of use rates
- Many have on peak, off peak and critical peak time periods
- Many are currently offering optional time of use with long term objective of moving most customer to time of use

Many utilities are moving toward or considering demand charges for distribution cost recovery for Residential customers

Residential Demand Implementation

- **Georgia Power** has optional Residential Demand charge at $6.53 kW
- **APS** Residential Demand Charge of $0.70/kW
- **Tucson Electric Power** Optional Residential Demand Charge $8.85 – $12.85
- **We Energy** Demand Charge $3.80/kW for solar
- **Alabama Power** Optional Demand Charge of $1.50
- **Polk County Public Power District** – Mandatory residential demand charges since 2014, Time of Use Rates in 2020
- **Cornhusker Public Power District** – Mandatory residential demand charges starting in 2018
- **Elkhorn Public Power District** – 2018 Mandatory residential demand charges
- **NorthCentral Public Power District –** Mandatory planning implementation in 2019
- **Burt County Public Power District** – Mandatory planning implementation in 2019

Tucson Electric Power

Time-of-Use (TOU)

Shift a majority of your usage to off-peak hours and reduce your monthly bill.

Learn more >

Peak Demand

Pay lower energy rates plus a charge for your highest hourly on-peak usage.

Learn more >

Demand TOU

Combines demand and time-of-use components to maximize your savings opportunities.

Learn more >

Basic

Pay bills based on your total monthly electric use, regardless of when it occurs.

Learn more >

At a Glance

Basic Service Charge:
$10 per month

Energy Charge, per kWh[1]:
Summer (May-Sept)
- On-peak - 10.06 cents
- Off-peak - 6.03 cents

Winter (Oct-Apr)
- On-peak - 6.66 cents
- Off-peak - 5.96 cents

Demand Charge, per kW[2]:
- Up to 7 kW - $8.85
- More than 7 kW - $12.85

On-peak hours:
Summer: M-F 3-7 p.m.
Winter: M-F 6-9 a.m. and 6-9 p.m.
Excludes all major holidays

Alabama Power Residential Rate Option

MONTHLY RATE

Base Charge: $14.50 per Customer; plus

Demand Charge: $1.50 per kW; plus

Charge for Energy:

JUNE 1 through SEPTEMBER 30

22.1822¢ per kWh during the Summer Peak Period (Weekdays 1:00 p.m. – 7:00 p.m. Central Time)

7.1822¢ per kWh during the Summer Economy Period (All Non-Peak Hours)

NOVEMBER 1 through MARCH 31

9.1822¢ per kWh during the Winter Peak Period (Weekdays 5:00 a.m. – 9:00 a.m. Central Time)

7.1822¢ per kWh during the Winter Economy Period (All Non-Peak Hours)

OCTOBER 1 through OCTOBER 31 and APRIL 1 through MAY 31

7.1822¢ per kWh for All Hours

Residential Demand Rate Implementation Case Study

- Cost of Service Demand Charges for distribution costs (1.77 kW)
- Initial Implementation $0.50/kW
- Second Year implementation $1.00/kW
- Fourth Year implementation $1.50/kW
- Completed a review to identify the impact on all customers to ensure rate impacts were acceptable to Board of Directors

Cornhusker Public Power District

- Implemented a $1.00 demand charge July 2018
  - Bill inserts, Website, Magazines
    - Explain demand charges and how differ from energy
  - How demand charges are determined
  - Customer portal to show demands and when peaks are occurring
  - Showed demand usage on customer bills for 8 months
  - Received two phone calls – 6,000 customers affected

Website

- https://cornhusker-power.com/billing/new-rate-structure/

Implementation

- Polk County 4 years of implementation has received no calls from customers but two requests from city councils to discuss demand charges
- Cornhuskers and Elkhorn's recent implementation has resulted in each receiving two phone calls

Consumers Affairs Arguments Against Demand Charges

Likely to benefit from demand rates and higher fixed monthly charges? Consumers Affairs Arguments

- Upper income: investments in home improvements, new technologies and appliances; income or credit rating to purchase solar
- Better education: understand complex rate designs and bills; time and energy to learn and respond
- Single Family Homeowner

Whose bill will increase with demand charges or fixed monthly charges? Consumers Affairs Arguments

- Low use customers
- Low income and fixed income customers
- Renters/multi-unit residents

Arguments Against Demand Charges

- Demand charges are not needed with decoupling
- Solar advocates say that residential demand charges will hurt the industry and be unfair to residential customers
- Increasing fixed charges only for DG customers is discrimination

Fixed Charges (Customer Charges) Cost Component Recovery

Recovers cost for connection to Grid at zero kWh consumption

- Meter operation, maintenance and replacement costs
- Meter reading costs or AMR installation costs
- Billing Costs
- Customer Service Department
- Service into customers facilities
- Portion of Distribution System
  - Cost to get a wire from the sub-transmission system to customer
  - Based on minimum sizing (If all customers only used a single kWh)

Residential Customer Charges (Survey of Costs, Not Rates Charged)

Utility	Customer Charge	Percent of Distribution Costs
Massachusette - One	28.49	56%
Connecticut One	27.11	47%
Connecticut Two	25.53	46%
Texas One	24.26	38%
North Carolina - Two	21.98	64%
Michigan One	21.89	41%
Minnesota - Three	21.60	61%
North Carolina - One	20.91	67%
Tennessee One	20.26	48%
California One	19.60	59%
Minnesota Utility - Two	17.61	66%
Minnesota Utility - One	17.32	58%
Average of Utilities providing Minimum System Data	**22.66**	**54%**

Customer (Facilities) Charges

- Stabilizes revenue
- Reduces seasonal subsidies
- May impact low use customers
- Low income may not be low use

Are Low Income Customer's Low Use?

- Low income customers some use more some less.
  - High or low number of people in home
  - Age, energy efficiency, own or rent
  - Mobile homes

- May consider low income assistance or energy efficiency programs

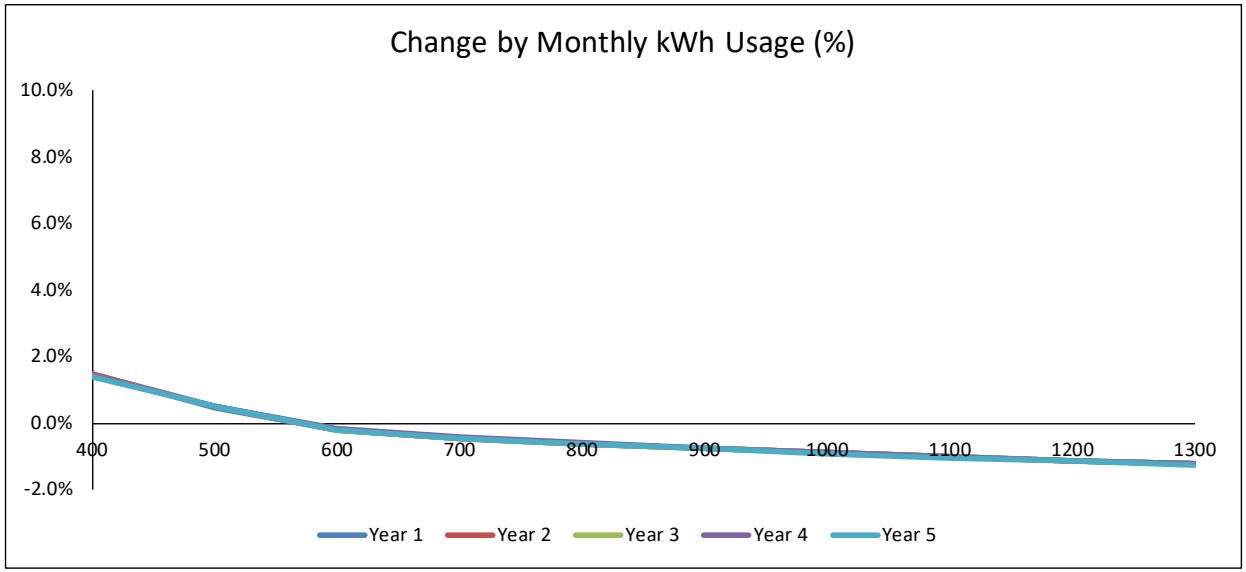
Environmentalists Arguments Against Higher Customer Charges

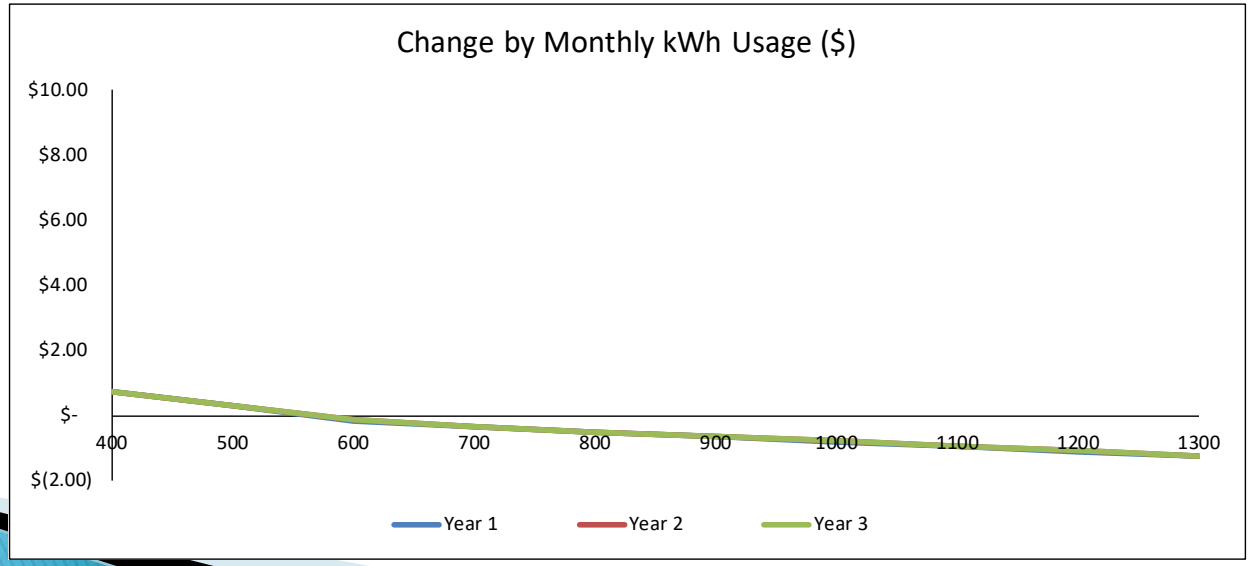
- All electric costs are variable in the long run
- Higher fixed charges send incorrect price signals
- Decoupling ensures recovery of fixed cost
- Higher fixed charges impacts low income
- Provides incentive for customers to disconnect from the Grid

Five Year Transition

Rates	Current	Year 1	Year 2	Year 3	Year 4	Year 5
Monthly Facilities Charge:						
Inside City Custome	$ 6.80	$ 9.30	$ 11.80	$ 14.30	$ 16.80	$ 19.30
Energy Charge:						
Winter All Energy	$ 0.1018	$ 0.0974	$ 0.0930	$ 0.0886	$ 0.0842	$ 0.0798
Summer Block 1 (Fir	$ 0.1100	$ 0.1056	$ 0.1012	$ 0.0968	$ 0.0924	$ 0.0880
Summer Block 2 (Ex	$ 0.1249	$ 0.1205	$ 0.1161	$ 0.1117	$ 0.1073	$ 0.1029
Power Cost Adjustment:						
All Energy	$ 0.0014	$ 0.0014	$ 0.0014	$ 0.0014	$ 0.0014	$ 0.0014
Energy Optimizatior	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008
Low Income Assista	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Revenue from Rate	$ 9,818,886	$ 9,816,847	$ 9,816,847	$ 9,816,847	$ 9,818,886	$ 9,818,886
Change from Previous		0.0%	0.0%	0.0%	0.0%	0.0%

Five Year Customer Impacts





Grid Access Charges

- Los Angeles, California uses a Power Access Charge

	Tier One	Tier Two	Tier Three
Zone Two	Firs 500	Next 1,000	Over 1,500
Zone One	First 350	Next 700	Over 1,050
Monthly Power Access Charge	**$ 1.30**	**$ 4.90**	**$ 15.00**
Customers Tier is based on highest annual usage over a 30 day period and billed for the next 12 months			

Large Midwest Utility Grid Access Charge

- Year One Objectives: Roll rate increase into customer charges and create three blocked rate design. Energy rates remained the same
- Year Two Objectives: Roll $0.01035/kWh from energy into the customer charge and create a fourth block between 2,000 and 4,000 kWh usage. Energy rates reduced by $0.0135/kWh

	Rates	Year One	Year Two
Customer Charges			
Between 0 - 500 kWh	$ 11.83	$ 13.50	$ 17.32
Between 501 - 2,000 kWh	11.83	$ 16.90	$ 23.63
Between 2,001 - 4,000 kWh	11.83	$ 16.90	$ 37.37
Equal to and above 4,001 kWh	11.83	$ 31.40	$ 64.34
Energy Rates - kWh	0.10160	0.10160	0.091248

Five Steps in Rate Strategy Development

1. Understanding the utilities cost: fixed and variable cost components (Marginal Costs)
2. Defining the utilities rate making objectives and identify gaps between current rates and objectives
3. Identification of technology needed to achieve the rate making objectives
4. Educating Utility Staff and Customers
5. Development of a transition plan

Implementation Method Considerations

- Opt Out – Customer has to intentionally opt out of rate and choose another – most customers stay in rate provided by utility
- Opt-In – Customer will choose if saves money based on current usage patterns. Win for customer, loss for utility

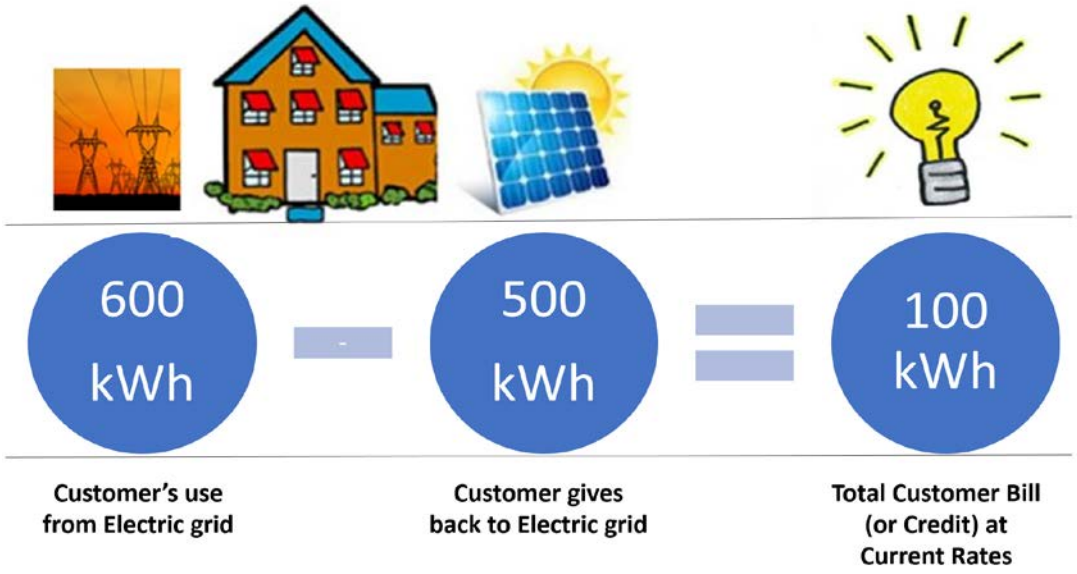
- Bill Inserts
- Quarterly Newsletters
- Including usage on bill prior to implementation
- Newspaper articles
- Website
- Include instruction on how modifications can save money

Opt In, Opt Out, Mandatory

Customer Education

Net Metering

Net metering charges customers the difference between energy delivered by the local utility and energy provided by customer to utility

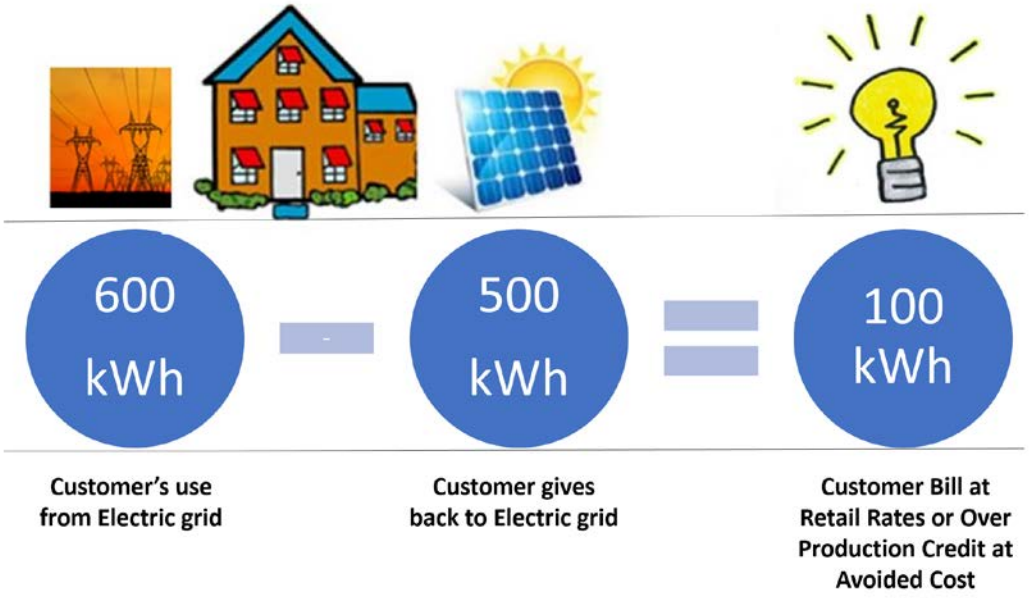


Example: Local utility provided 600 kWh to customer and customer provided back 500 kWh's.

Customer is billed at net (100 kWh's) at retail rate

Net Billing

- Becoming one of more popular methods
  - Requires a more accurate rate structure
- Customer is charged for all energy taken from local utility and is credited at avoided cost for customer provided energy



Example: Customer takes 600 kWh's from utility and gives back 500 kWh's

Sample of Net Billing Programs

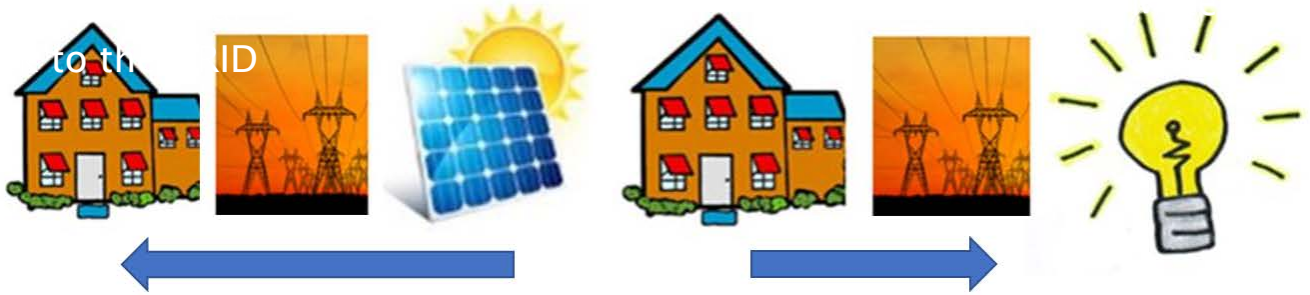
Utility	Program	Notes
Turlock Irrigation District	Net Billing Time of Use Program	Mandatory Time of Use Rates
		TOU Demand and Fixed Charges
Imperial Irrigation District	Net Billing Approved	
Palo Alto	Net Billing Proposed	
Modestor Irrigation District	Net Billing Proposed	
SMUD	Proposed Net Billing Time of Use Program	Mandatory Time of Use Rates
		Possible demand and infrastructure system fixed charage
		Possible minimum charge
Marquette, Michigan	Net Billing Approved	
Sturgis Michigan	Net Billing Approved	
Excel Energy	Net Billing	
CPS Energy	Net Billing	
Nevada	Net Billing	
Mexico	Net Billing	

Buy All; Sell All

energy taken from GRID and energy produced by solar array less energy

Customer receives a credit for all energy produced by solar array

Meter on solar unit



600 kWh + 800 kWh − 500 kWh = 900 kWh − 800 kWh

Customer's use from Electric grid at Retail Rates	Total Generation from Solar Panel at Retail Rates	Customer gives back to Electric Grid at Retail Rates	Billed at Retail Rates	Credit at Avoided Cost

Sample of Buy All – Sell All Tariffs (VOSTs)

- Becoming popular with utilities:
  - Santa Clara Utah
  - Austin Texas
  - Promoted by Utah Association of Municipal Power Systems (UAMPS)
  - Approved Methodology for all Utilities in Minnesota

	Net Metering	W/O Net Metering	Net Billing	Buy All; Sell All
Meter in	**600**	**900**	**600**	**600**
Meter Out	**500**	**-**	**500**	**500**
Production from Solar Unit	800	-	800	800
Customers Usage	900	900	900	900
Customer KWH Usage for billing	**100**	**900**	**600**	**900**
Utility Rates				
Facilities Charge	$ 9.00	$ 9.00	$ 9.00	$ 9.00
Energy Rates KWH				
First 500 kWh's	0.08000	0.08000	0.08000	0.08000
Excess kWh's	0.12000	0.12000	0.12000	0.12000
PCA	0.01000	0.01000	0.01000	0.01000
Value of Solar	0.06500	0.06500	0.06500	0.06500
Customer Charges				
Facilities Charge	$ 9.00	$ 9.00	$ 9.00	$ 9.00
First Block Charges	8.00	40.00	40.00	40.00
Second Block Charges	-	48.00	12.00	48.00
PCA	1.00	9.00	6.00	9.00
Credit for Value of Solar			(32.50)	(52.00)
Total Charge	**$ 18.00**	**$ 106.00**	**$ 34.50**	**$ 54.00**

Questions?

International consulting firm providing cost of service and financial plans and services to utilities across the country, Canada, Guam and the Caribbean