Overview of Utility Financial Operations for Boards and Councils

Presentation by Utility Financial Solutions, LLC

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- International consulting firm providing cost of service and financial plans and services to utilities across the country, Canada, Guam and the Caribbean
- Instructors for cost of service and financial planning for APPA, speakers for organizations across the country, including AWWA.

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Objectives

- Basic understanding of cost structure and its impact on rates
- What information does a cost of service study provide and how is it used
- Current rate design trends
- How rate designs are changing to reflect future industry trends

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Overview of the Rate Setting Process

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Why is Cost of Service Important?

- Cost of service is:
  - A method to equitably allocate the revenue requirements of the utility among the various customer classes of service
  - *What revenues should I recoup from whom and how should I do it?*

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Three Important Objectives of COS

- ONE: Ensure rates recover costs to provide service to customers (Revenue Requirements)
- Objective Two: Defines optimal rate structure
  - Customer Charge
  - kWh Charge
  - Demand Charge
  - Power Cost Adjustment
- Objective Three: Reduce cross between classes

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Cost of Service and Customer Classes

Why Costs Vary by Customer Class

- Costs vary because customers use electricity differently – grouped according to similar usage
  - Residential, Commercial, Industrial
- Delivery of electricity consists of mainly four components:
  - Power Supply
    - Local Production
    - Purchases
  - Transmission
  - Distribution System
  - Customer Specific Costs

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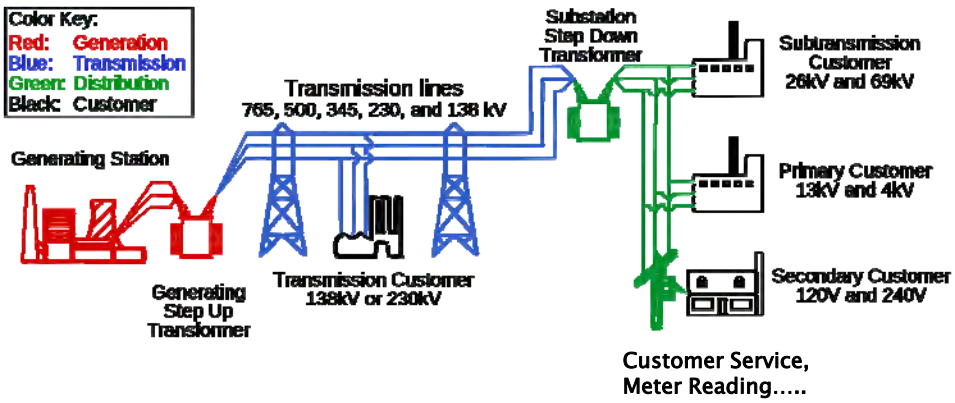
Basic Overview of Electric System



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Power Supply Costs by Class of Customer

- Demand related power costs
  - Some customers contribute a greater amount to the peak demands of the system
- Energy related power costs
  - Power costs can vary by season or time
  - Some customers use more energy during on-peak hours

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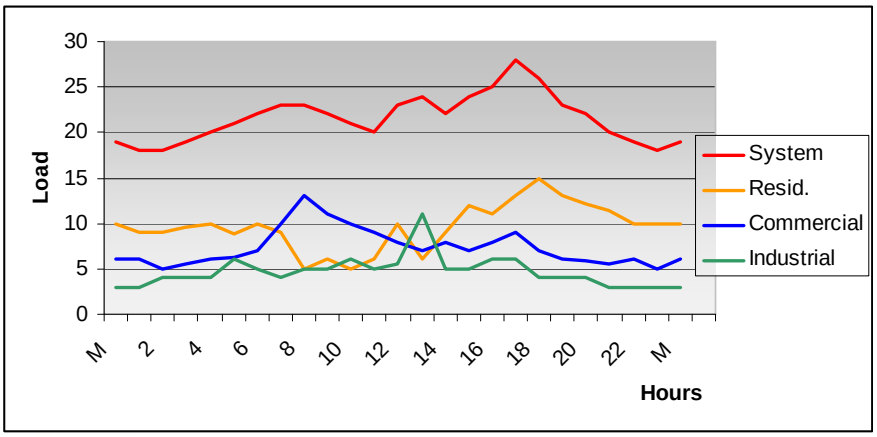
Load Data Example



This is an example, not Riverside's data

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Distribution Costs

- Identifies the cost to operate and maintain the distribution infrastructure
- Customers are served at different voltage levels:
  - Sub transmission – Customer avoids all the distribution system infrastructure
  - Primary Voltage – Customer owns transformer and service drop
  - Secondary Voltage – Uses all the infrastructure of the distribution system

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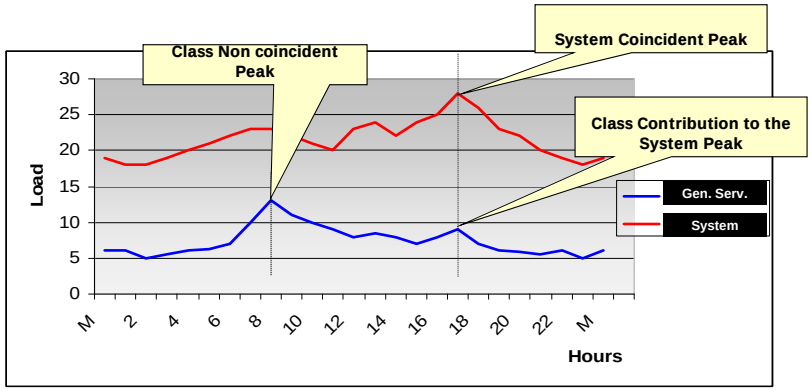
Relationship of Coincident to Non coincident Peak Demands



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Customer Charges

- Costs that do not vary with usage:
  - Meter operation, maintenance and replacement costs
  - Meter reading
  - Billing Costs
  - Customer Service
  - Portion of Distribution System (35-50%)

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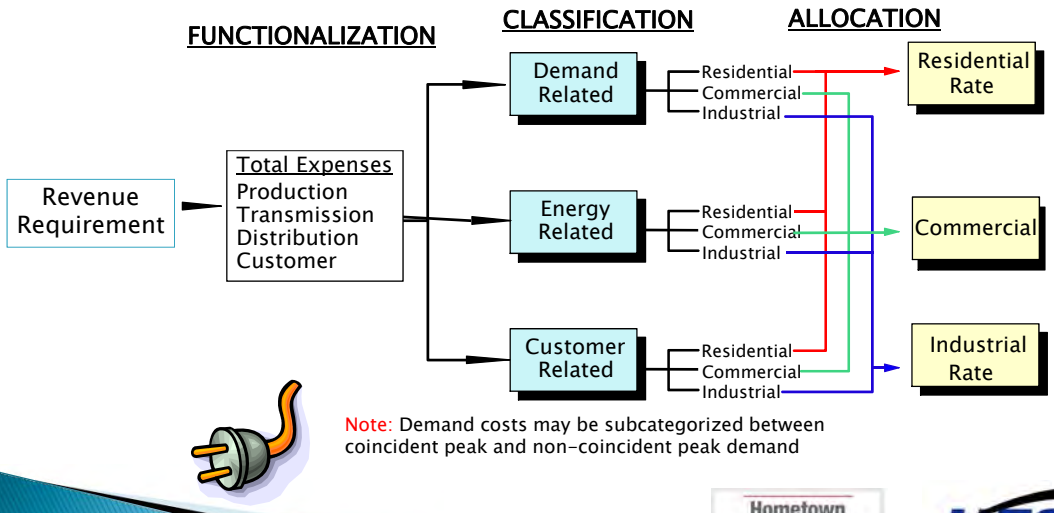
Overview of a Electric Cost of Service Study



Note: Demand costs may be subcategorized between coincident peak and non-coincident peak demand

COS and Rate Subsidization

Cost of Service Summary

Customer Class	Cost of Service	Projected Revenues	Change to Meet COS
Residential Service Rate A	3,310,810	3,048,700	9%
General Secondary Service - Rate B	2,189,888	1,973,674	11%
Street Lighting	120,840	106,000	14%
Secondary Demand/Energy Service - Rate C	2,613,477	2,632,694	-1%
Primary Demand/Energy Service - Rate D	13,205,053	13,425,300	-2%
Total	**21,440,068**	**21,186,368**	**1.2%**
Revenue Increase Needed		**$ 253,700**	

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Reduce cross -subsidization between classes

- Certain rate classes can be subsidizing other rate classes.
  - Example: Industrial class subsidizing the residential and commercial

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Subsidization – When an overall increase is needed

- Move toward cost to serve using a bandwidth on customer classes:
  - If trying to achieve an overall 1.2% increase, no class will receive more than 3.2% (1.2+2=3.2) increase, no class less than -0.8% (1.2-2=-0.8) increase.
- This gives the rate design room to move classes closer together without rate shock to any one class

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Subsidization – When an overall increase is needed

Customer Class	Cost of Service	Projected Revenues	Change to Meet COS	Rate Adjustments	Revenue Adjustment
Residential Service Rate A	3,310,810	3,048,700	9%	3.2%	$ 97,558
General Secondary Service - Rate B	2,189,888	1,973,674	11%	3.2%	63,158
Street Lighting	120,840	106,000	14%	3.2%	3,392
Secondary Demand/Energy Service - Rate C	2,613,477	2,632,694	-1%	0.8%	21,062
Primary Demand/Energy Service - Rate D	13,205,053	13,425,300	-2%	0.5%	67,127
Total	**21,440,068**	**21,186,368**	**1.2%**	**1.2%**	**$ 252,296**
Revenue Increase Needed		**$ 253,700**			

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Rate structure far from COS?

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Customer Charges

- Increasing customer charges helps stabilize revenues
  - Declining sales
- Reduces subsidy between year-round customers and seasonal customers
- Low income not the same as low use
  - *At most utilities, low income customers tend to be higher than average users. A higher customer charge may benefit low income depending on housing mix* (Have to check demographics at your specific utility)

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Correction of Customer Charges

- Correct during rate changes
- Revenue neutral rate adjustment when increases are not required
  - Customer charge increased
  - Energy charge decreased

- Set a plan to move in increments over time
- Look at impact by usage and dollar

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COS Results

Customer Class	Current Customer Charge	COS Customer Charge	Difference
Residential	$ 6.80	$ 16.83	$ 10.03
General Service	10.80	84.80	$ 74.00
Large Power	50.00	154.51	$ 104.51

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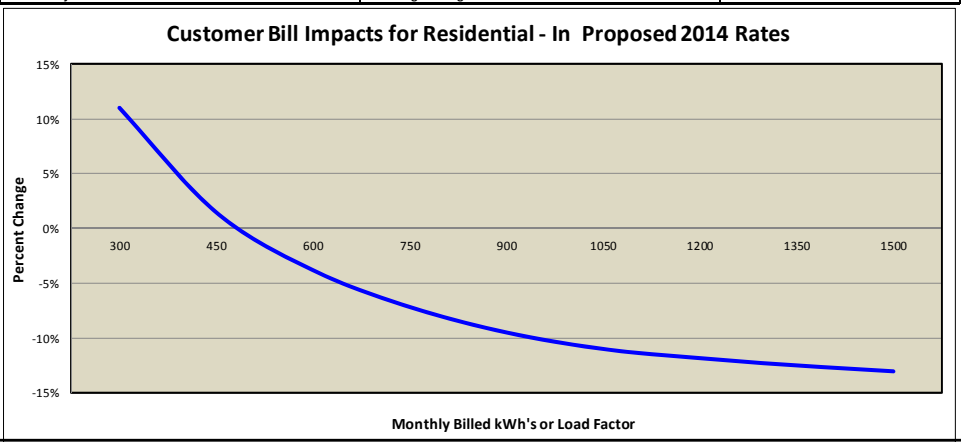
	Current Rates	Proposed 2014 Rates		Cost of Service Rates	
Monthly Customer Charge:		**Monthly Customer Charge:**		**Monthly Customer Charge:**	
All Customers	$ 6.80	All Customers	$ 16.83	All Customers	$ 16.83
Energy Charge:		**Energy Charge:**		**Energy Charge:**	
Winter Block 1 (0 - 1000 kWh)	$ 0.0744	Winter Block 1 (0 - 1000 kWh)	$ 0.0685	Winter	$ 0.0750
Winter Block 2 (1001 - Excess kWh)	$ 0.0700	Winter Block 2 (1000 - Excess kWh)	$ 0.0685	Summer	$ 0.0890
Summer Block 1 (0 - 1000 kWh)	$ 0.0744	Summer Block 1 (0 - 1000 kWh)	$ 0.0800		
Summer Block 2 (1001 - Excess kWh)	$ 0.0700	Summer Block 2 (1000 - Excess kWh)	$ 0.0800		
Fuel Adjustment(PCA) (0 - 0 kWh)	$ 0.01862	Fuel Adjustment(PCA) (0 - 0 kWh)	$ -		
Revenues from Current Rates	$ 4,597,848	**Revenues from Proposed Rates**	$ 4,598,664	**COS Revenues**	$ 4,915,075
Model Proof to Financial Statements	***0.23%***	**Percentage Change from Current**	0.02%		



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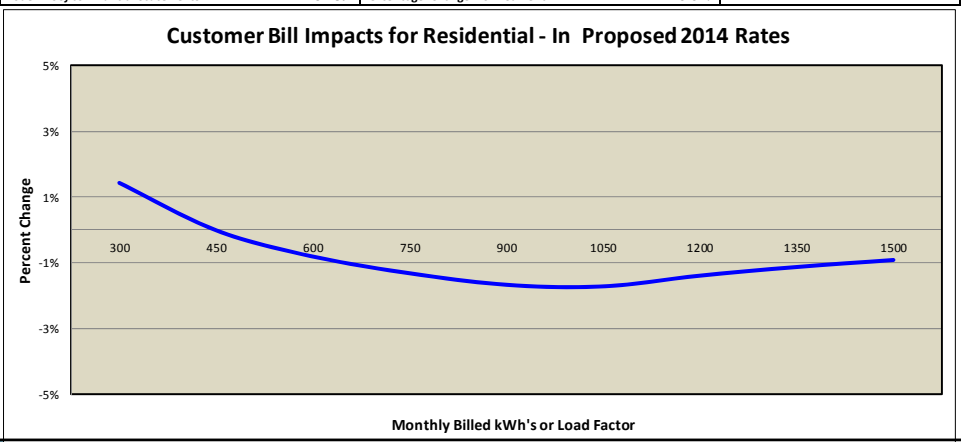
	Current Rates	Proposed 2014 Rates		Cost of Service Rates	
Monthly Customer Charge:		**Monthly Customer Charge:**		**Monthly Customer Charge:**	
All Customers	$ 6.80	All Customers	$ 8.30	All Customers	$ 16.83
Energy Charge:		**Energy Charge:**		**Energy Charge:**	
Winter Block 1 (0 - 1000 kWh)	$ 0.0744	Winter Block 1 (0 - 1000 kWh)	$ 0.0880	Winter	$ 0.0750
Winter Block 2 (1001 - Excess kWh)	$ 0.0700	Winter Block 2 (1000 - Excess kWh)	$ 0.0880	Summer	$ 0.0890
Summer Block 1 (0 - 1000 kWh)	$ 0.0744	Summer Block 1 (0 - 1000 kWh)	$ 0.0930		
Summer Block 2 (1001 - Excess kWh)	$ 0.0700	Summer Block 2 (1000 - Excess kWh)	$ 0.0930		
Fuel Adjustment(PCA) (0 - 0 kWh)	$ 0.01862	Fuel Adjustment(PCA) (0 - 0 kWh)	$ -		
Revenues from Current Rates	$ 4,597,848	**Revenues from Proposed Rates**	$ 4,598,313	**COS Revenues**	$ 4,915,075
Model Proof to Financial Statements	***0.23%***	**Percentage Change from Current**	0.01%		



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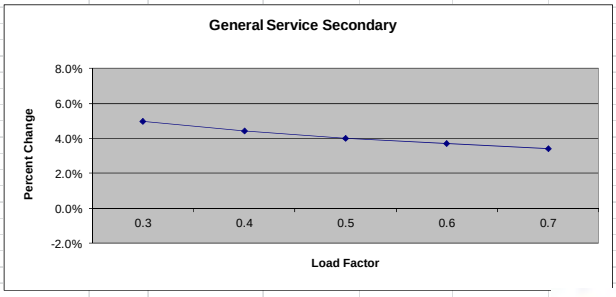
Demand Example

Example of Proper KW Charge

Current Rate	Customer Charge	Demand Charge	kWh
Winter Rate	$ 50.00	$ 11.33	$ 0.0412
Summer	$ 50.00	$ 11.33	$ 0.0412
Proposed Rate	**Customer Charge**	**Demand Charge**	**kWh**
Winter Rate	$ 65.00	$ 12.15	$ 0.0415
Summer	$ 65.00	$ 12.15	$ 0.0415
Cost of Service	**$ 77.76**	**$ 12.17**	**$ 0.049**
	Current Revenues		$ 3,686,551
	Proposed Revenues		3,813,873
	Rate Change		**3.5%**

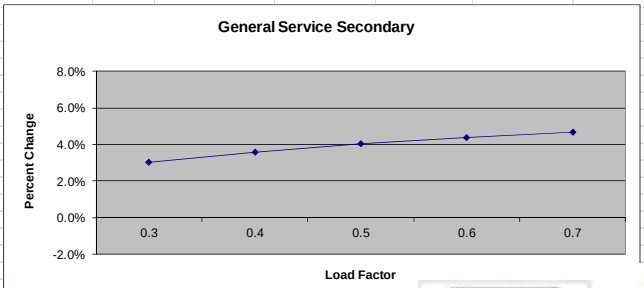


Too much in kWh cost recovery?

Current Rate	Customer Charge	Demand Charge	kWh
Winter Rate	$ 50.00	$ 11.33	$ 0.0412
Summer	$ 50.00	$ 11.33	$ 0.0412

Proposed Rate	Customer Charge	Demand Charge	kWh
Winter Rate	$ 78.00	$ 11.00	$ 0.0443
Summer	$ 78.00	$ 11.00	$ 0.0443
Cost of Service	**$ 77.76**	**$ 12.17**	**$ 0.049**

Current Revenues	$ 3,686,551
Proposed Revenues	3,817,143
Rate Change	**3.5%**



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Distribution Recovery

- For demand rate customers, most inaccurate method of distribution cost recovery is through a kWh charge
- Distribution system is constructed to handle a customers peak demand or a classes peak demands and are not constructed to handle kWh's
  - Typically billed on peak monthly demand

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Example of Distribution Recovery Using kWh's and KW

Method of Distribution Recovery					
Demand Rate	$ 5.90				
kWh Charge	0.0223				
Load Factor	**20.0%**	**30.0%**	**40.0%**	**50.0%**	**60.0%**
Peak Demand	**1,000**	**1,000**	**1,000**	**1,000**	**1,000**
kWh's Used by Customer	**146,000**	**219,000**	**292,000**	**365,000**	**438,000**
Demand Rate	5,899	5,899	5,899	5,899	5,899
Energy Rate	3,259	4,888	6,517	8,147	9,776
Difference	(2,640)	(1,011)	619	2,248	3,877

- For this example, recovery on kWh and kW would produce the same cost recovery
- The example customers all create the same demand on the distribution infrastructure
- The kWh method produced a subsidy for low load factor customers from high load factor customers

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Rate Design

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Proper Rate Design

- Proper Rate structure = Fixed and Variable costs
- Customer charge – Recover fixed costs of meter reading, billing, customer service, and a portion of maintenance and operations of the distribution system
- Demand charge –
  - Demand component of power supply
  - Distribution component
- KWh – In general, variable portion of power supply
- PCA – Pass through for changes in power supply

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Current Designs Simplified Example

	Monthly Charge	First 500 kWh	Over 500 kWh
Flat	$ 10.00	$ 0.08	$ 0.08
Declining	10.00	0.09	0.07
Inclining	10.00	0.07	0.09

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Current Rate Structures

- Flat Rate Structures – Easy to understand and administer
- Declining Block Rate Structures – Can create the most revenue stability
- Inclining Block Rate Structures –
  - Usually a 25% rate differential in blocks for customers to respond
  - Many Inclining block rate structures shifted to much of the fixed cost recovery into latter blocks adversely impacting utility financial statements
- Time Differentiated Rates

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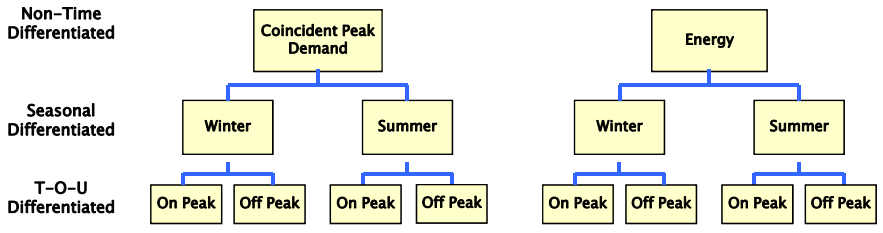
Time and Seasonal Differentiation Rate Design



- Seasonal
  - Winter
  - Summer
- Time of Use (TOU)
  - On peak
  - Off peak

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Time and Seasonal Differentiation

- Advantages
  - More closely tracks costs
  - Gives price signals brackets
- Disadvantages
  - Metering
  - Require more customer attention
  - Cost differential between time periods may not be large enough to off-set administration/billing costs
  - Budget billing can hide price signal for seasonal rates

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Why These Worked Historically

- Greatly generalized, residential customers woke up, took a shower, went to work, came home, turned on the lights, cooked dinner, watched TV, did a load of laundry, went to bed.
- Each customer in the residential class looked an awful lot like the next - utilities could lump energy and demand elements together into $/kWh price.
- Today residential customers are not the same. Smart thermostats, plug-in electric vehicles, rooftop solar, demand-flexible water heaters, battery energy storage, and myriad of other technologies that make their loads and consumption patterns potentially very different.

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Distributed Energy Resources
Difference in Resources

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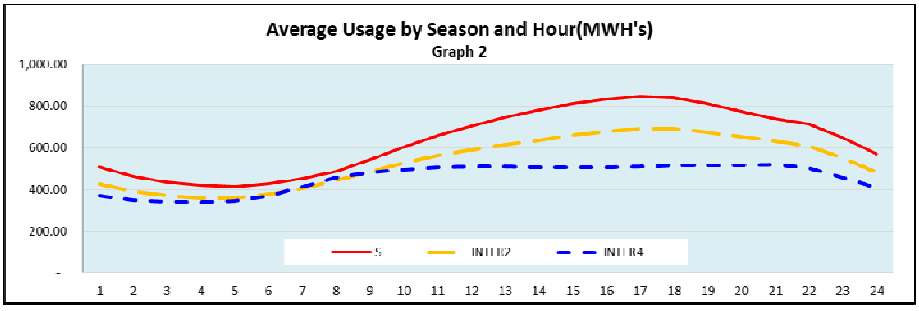
Sample System Load Curve



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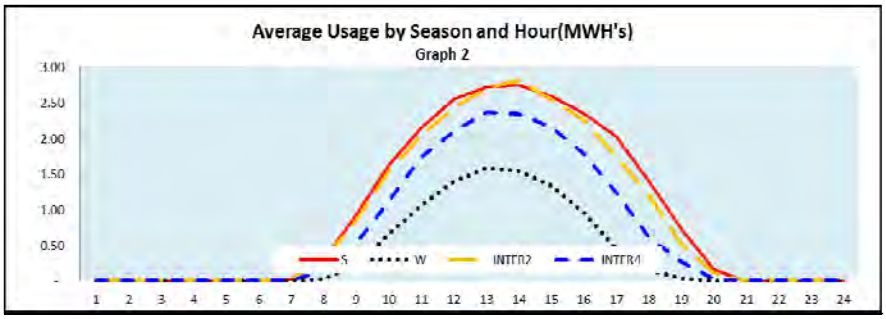
Solar Production Curve (Sample)



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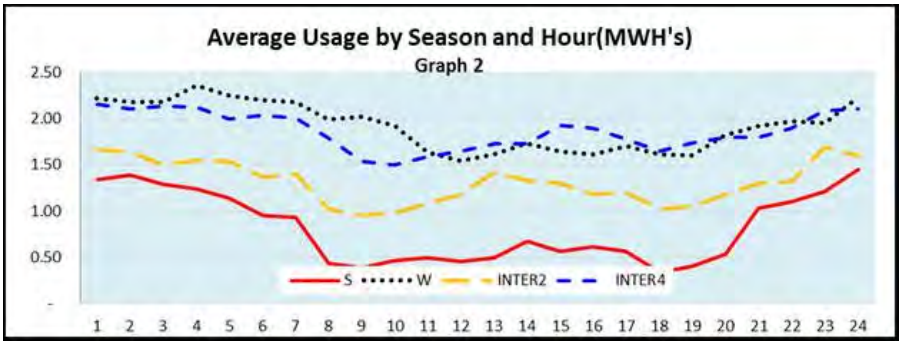
Wind Production Curve (Sample)



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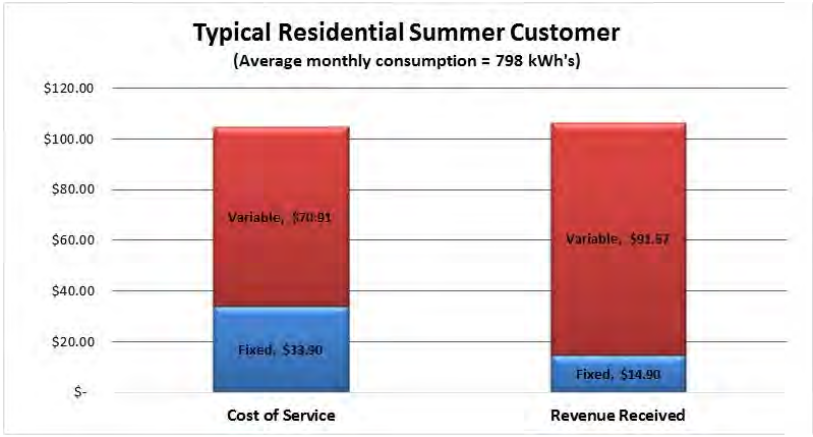
Comparison of Fixed and Variable



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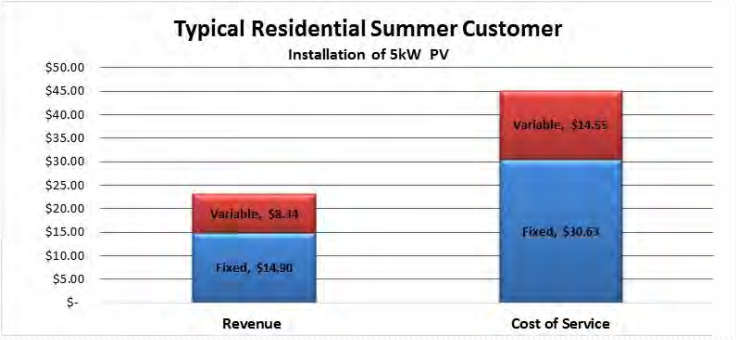
Comparison of Fixed and Variable After Net Metering



- ***Comparison with Utility that Purchases Power Supply***
- PV unit installation – 5kW
- Midwest PV Unit – 2013 data
- PV production – 725 kWh
- Customers Peak Distribution Demand – Before PV – 5.16 kW; after PV 3.59 kW
- Customer Peak to System Demands – Before PV 2.11 kW; after PV 0.61 kW

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Issues with Net Metering

- Whenever subsidies occur, it will cause problems in the future.
  - Customer has relied on the price signal to install the solar unit
  - At some point the subsidy will need to be removed
- Billing and Metering Options (Depends on metering and billing capabilities)
  - Net Metering additional charge
  - Buy All/Sell All
  - Net Billing

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Billing and Meter Options

- Net metering with additional charge for distribution recovery
  - Difference between what they take off the system and what they give back. (1,000 take, gave 600, billed 400)
  - Additional charge for distribution under recovery
  - Can be negatively viewed by customer, "why am I paying more?'

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Billing and Meter Options

- Avoided Cost recovery
  - Measures how solar reduces energy and capacity on power supply side, as well as long run marginal cost on distribution system (reduce need for capacity addition)
- Buy all sell all (two meters)
  - Took 1,000, gave back 600, solar produced 800. (Solar metered separately
  - House used 1,200 (1,000+800-600)
  - Billed retail at 1,200; credited avoided cost at 800
- Net Billing
  - Took 1,000, gave back 600. Billed retail at 1,000 and avoided cost credit at 600.

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"Ideal" Rate Structure

Example "Ideal" Rate Structure	EXAMPLE Rate
Power Supply Customers Demand Coincident with System Peak	$ 12.72
Distribution Recovery Based on Customers Maximum Demand	2.19
Energy Charge (Seasonal, TOU)	0.0442
Customer Charge	21.44
Transfer to the General Fund	7%

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"Ideal" Rate Strategies

- Add utility of the future – Small periodic increases to keep up with inflation
  - 0–5% – inflationary
  - 5–9% – a few large industrials
  - Double digits = complaints
- Phase in large increases over time
- When possible, implement Increases in the transition month =Transparent
- Survey of local rates (positive and negative)
  - Structure apple to apples?
  - What kind of rates do they need to not care what customer are doing behind the meter –

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Questions?

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