Technical Conference on Net Metering Load Research Study

November 5, 2014

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Introduction

- Technical Conference requested by Commission in Docket No. 14-035-114 for PacifiCorp to present its plan for load research study

- Presentation Overview:
  - Background of Load Research
  - Overview and Status of Utah Residential Net Metering Study
  - Proposed Next Steps

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What is Load Research?

"load research allows utilities to study the ways their customers use electricity, either in total or by individual end uses"

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So… What is it really?

The study of how and when our customers use energy so that PacifiCorp can most effectively:

- Allocate Costs
- Design Customer Rates
- Forecast Loads
- Size Transformers & Distribution Circuits
- Provide Enhanced Customer Service

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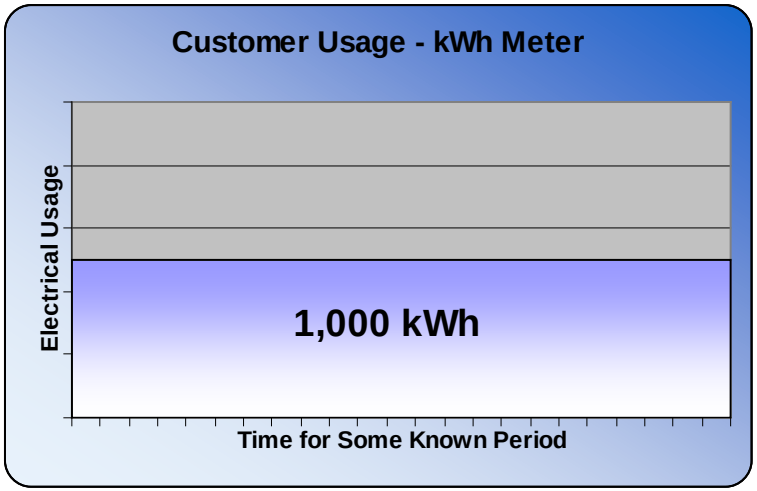
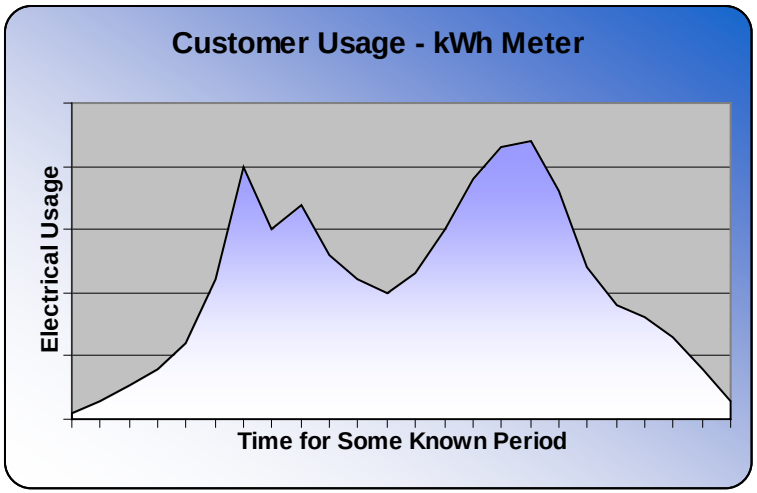
Billing vs. Load Profile Metering

- Electric usage varies over time and by customer type
- PacifiCorp is obligated to provide electricity (load) when the customer demands (kW) and for the length of time that the customer needs it (kWh).
- Load research (interval) data provides an important data input into planning, regulatory and financial decision making processes…





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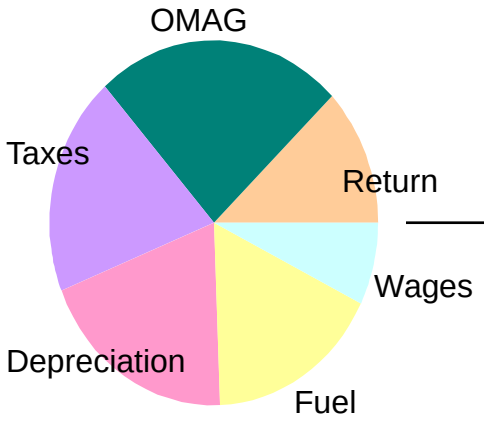
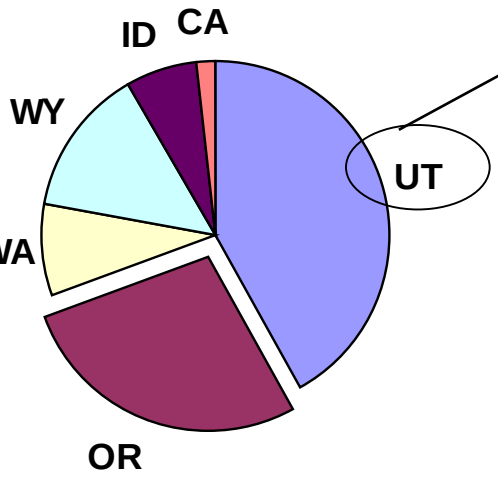
How is Load Profile Data Used?

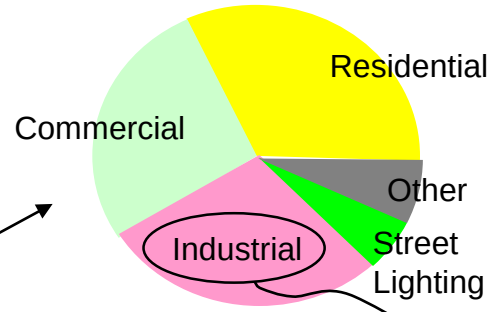
Step 1: Total Company Revenue Requirement



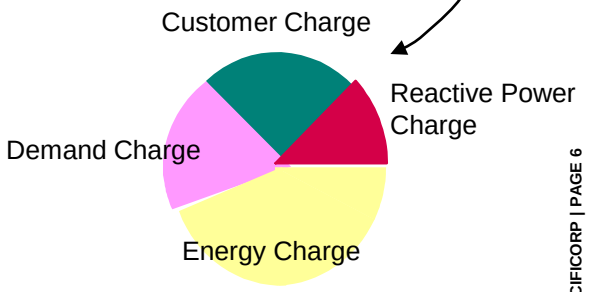
Step 2: Jurisdictional Allocation



Step 3: Class Cost of Service



Step 4: Rate Design



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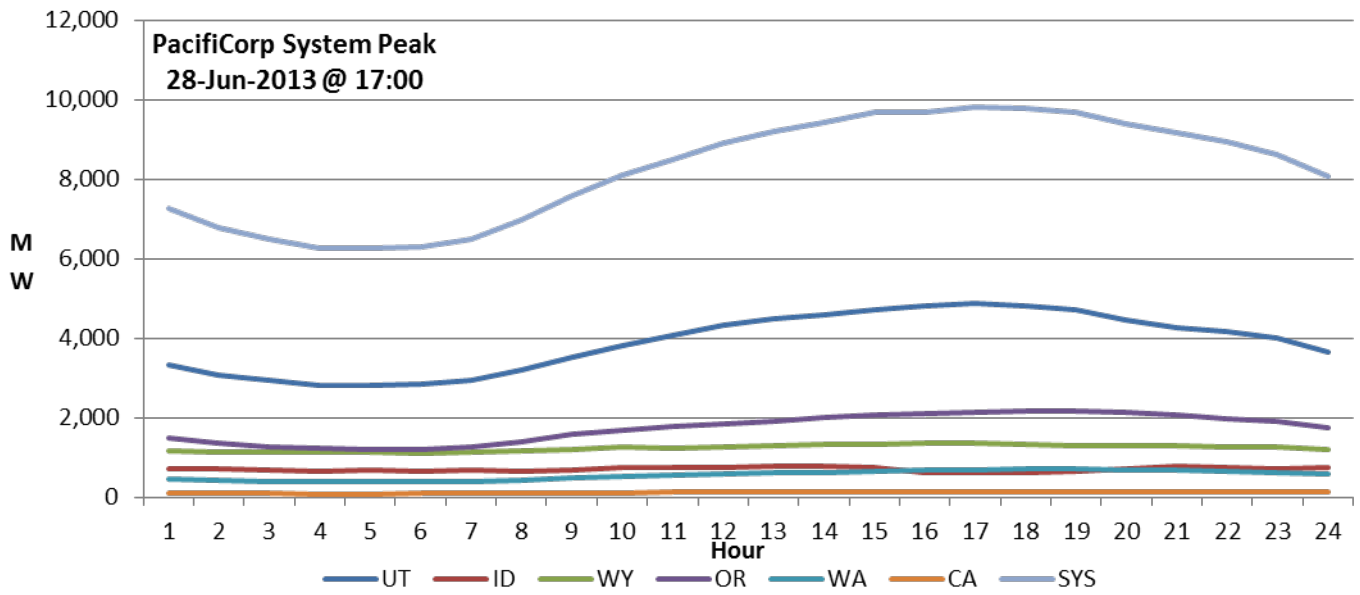
Load Profiles Used in Cost Allocations – System



Power Operations Metering

- Load are derived from metering at Company owned generation sites, third party generation sites, and jurisdictional tie-line points.
- Because the data is collected at the source of generation, it includes actual losses.

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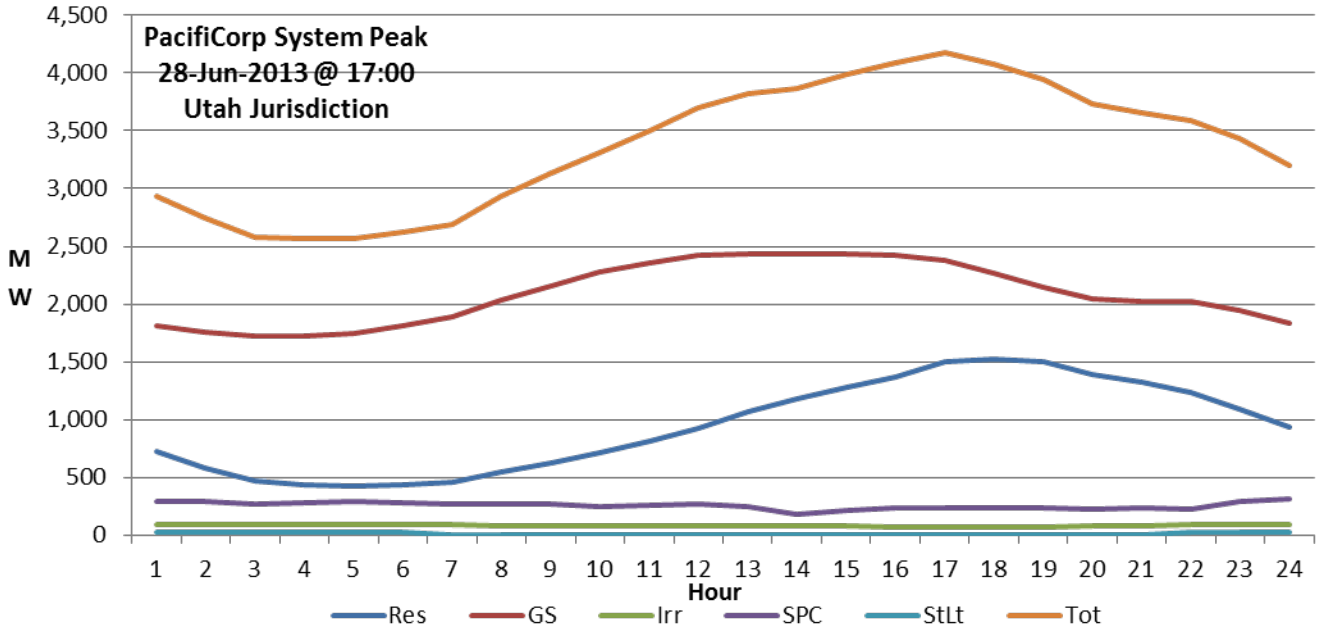
Load Profiles Used in Cost Allocations – State



Load Research Metering

- Loads are derived from load study surveys, census metering, and load data estimation.
- Because the data is collected at the point of delivery, losses must be added back in.

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Load Research Data in the Cost of Service Study

- Used to develop allocation factors to spread generation, transmission, and distribution costs to rate schedules:
  - Monthly Coincident Peaks
    - Allocates generation and transmission demand costs
  - Monthly Distribution Peaks
    - Substations, poles, conductors
  - Non-coincidental Peaks (NCP)
    - Transformers and secondary lines

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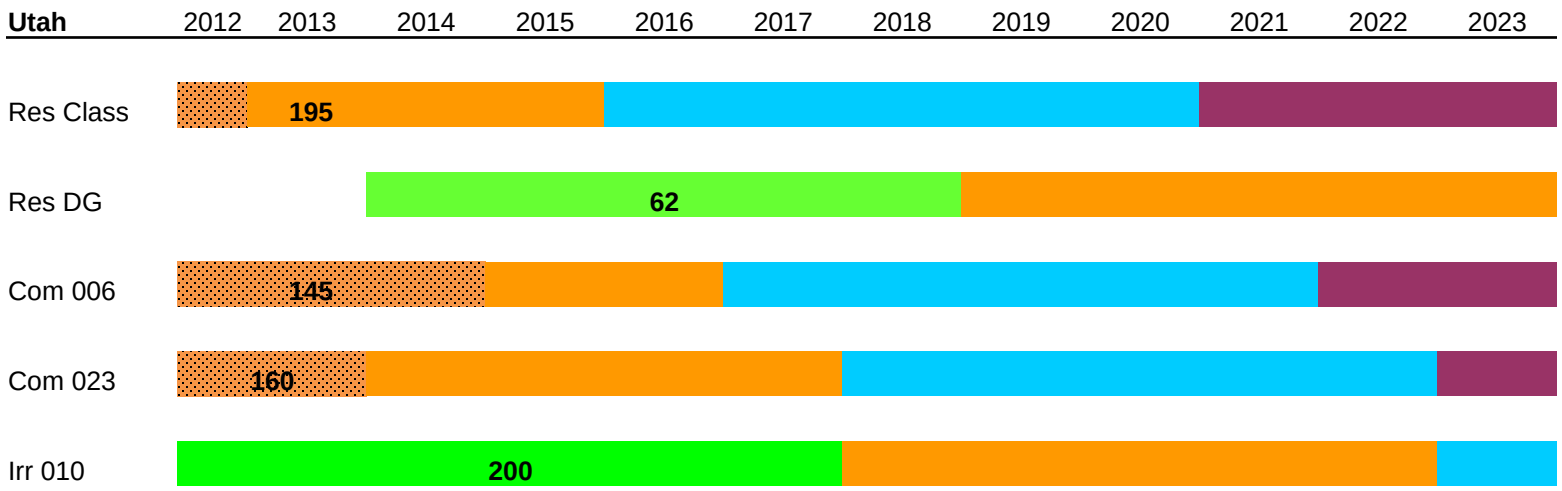
Load Studies

- Load Studies scheduled for 5-year rotation
- Normal design standard is +/- 10% precision
- Currently 26 load studies across 6 jurisdictions



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Examples of Load Shapes

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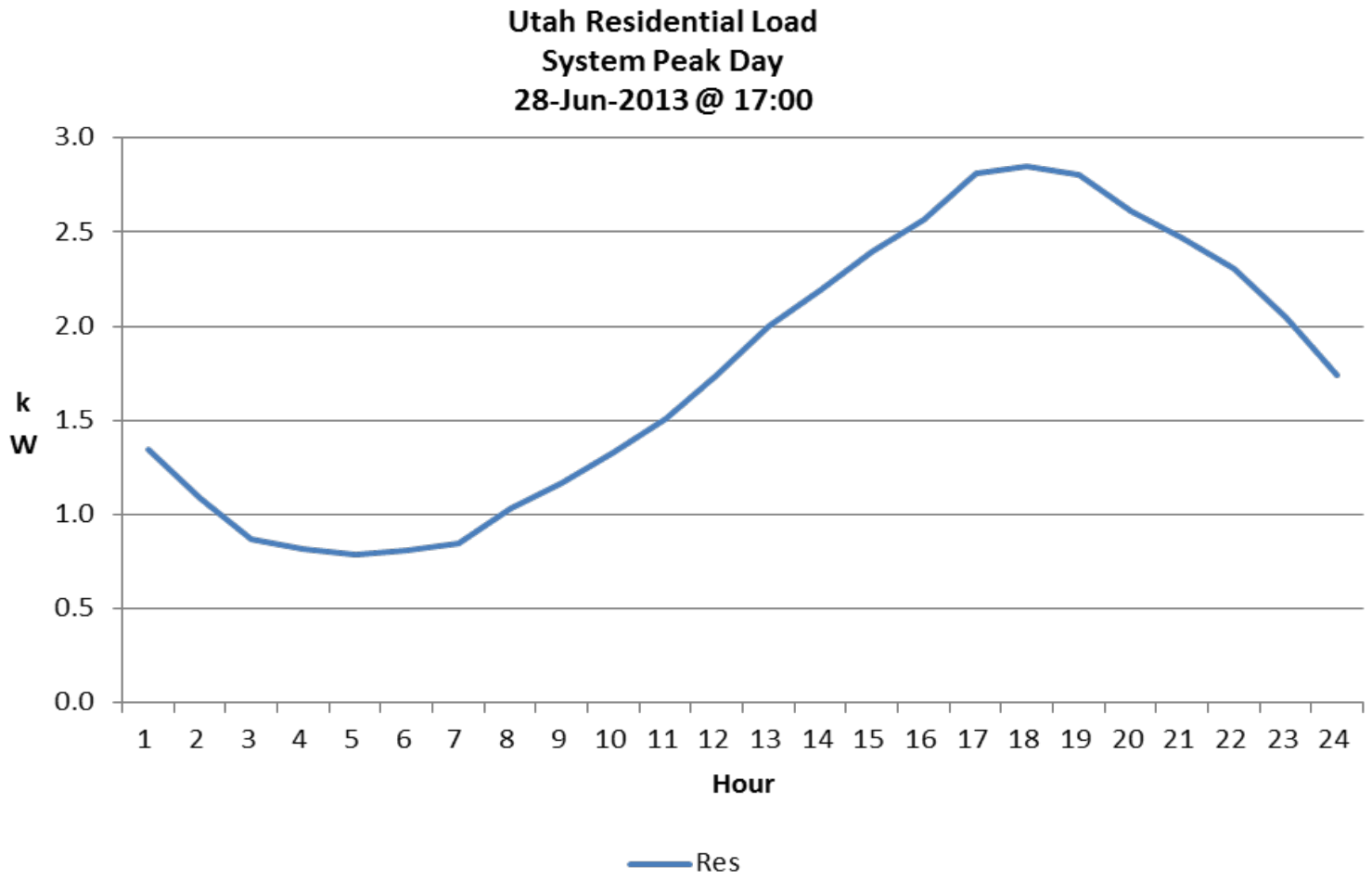
Average Residential Load Profile



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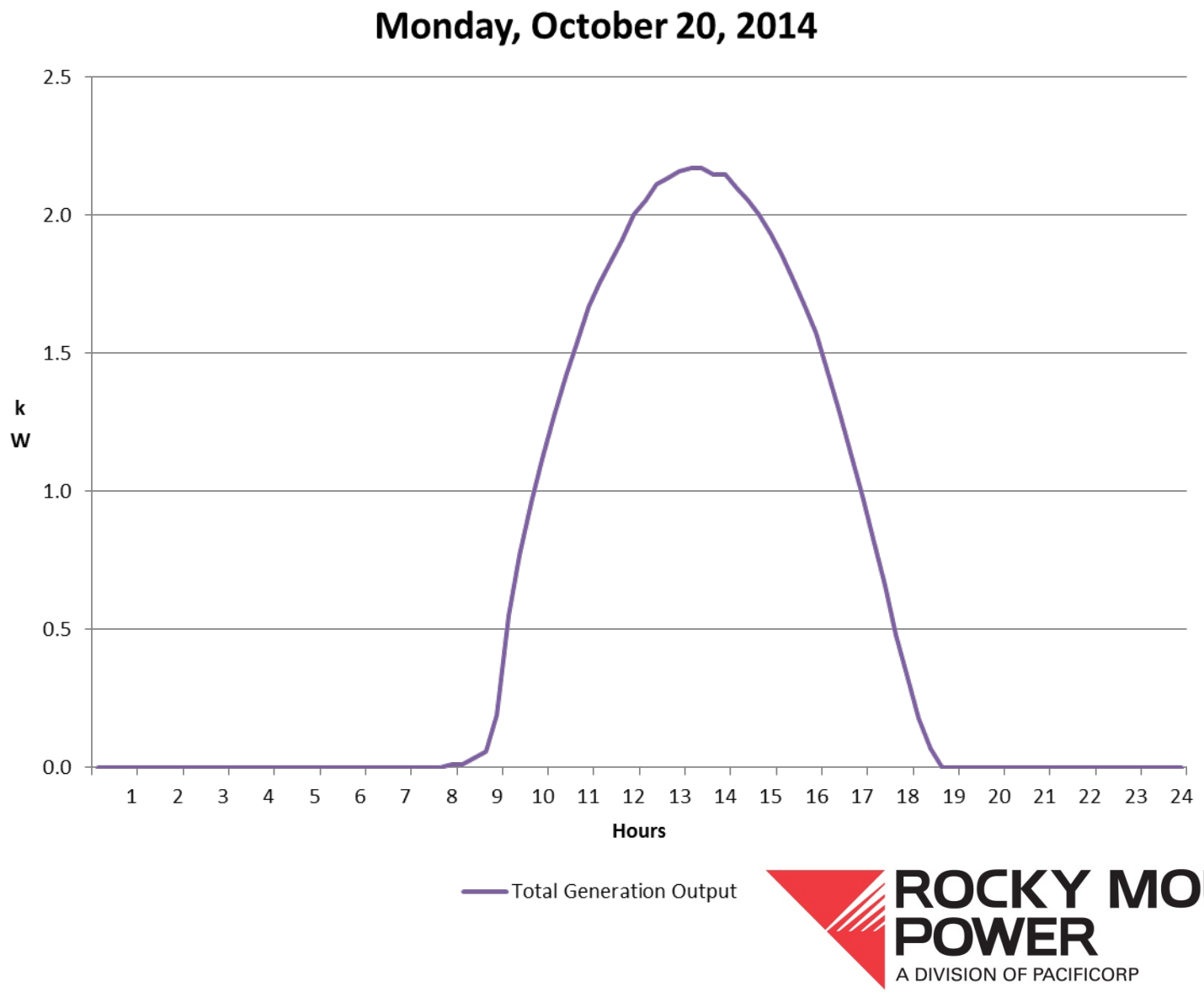
Sample Customer Production Meter Output



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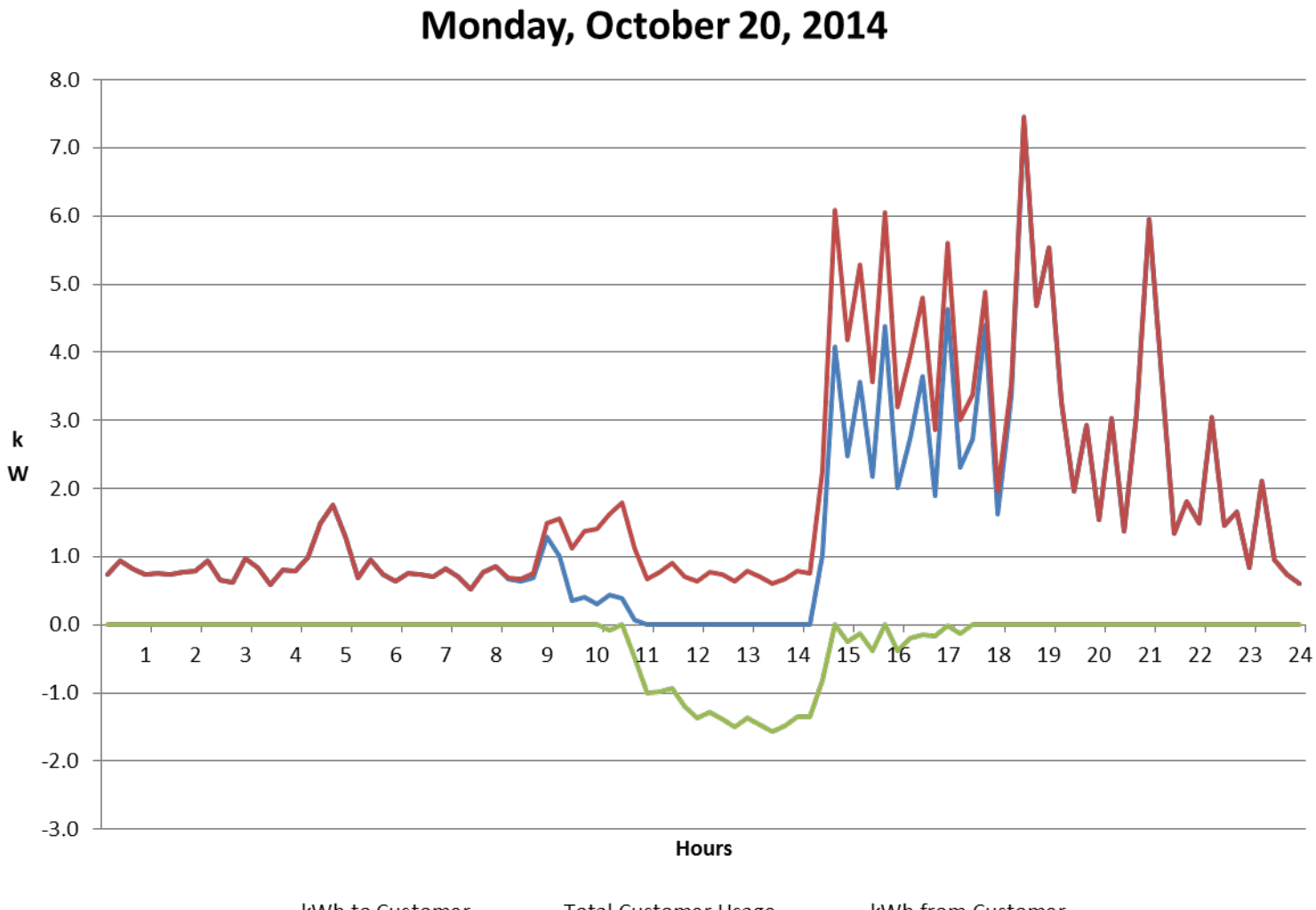
Sample Customer Net Meter Output



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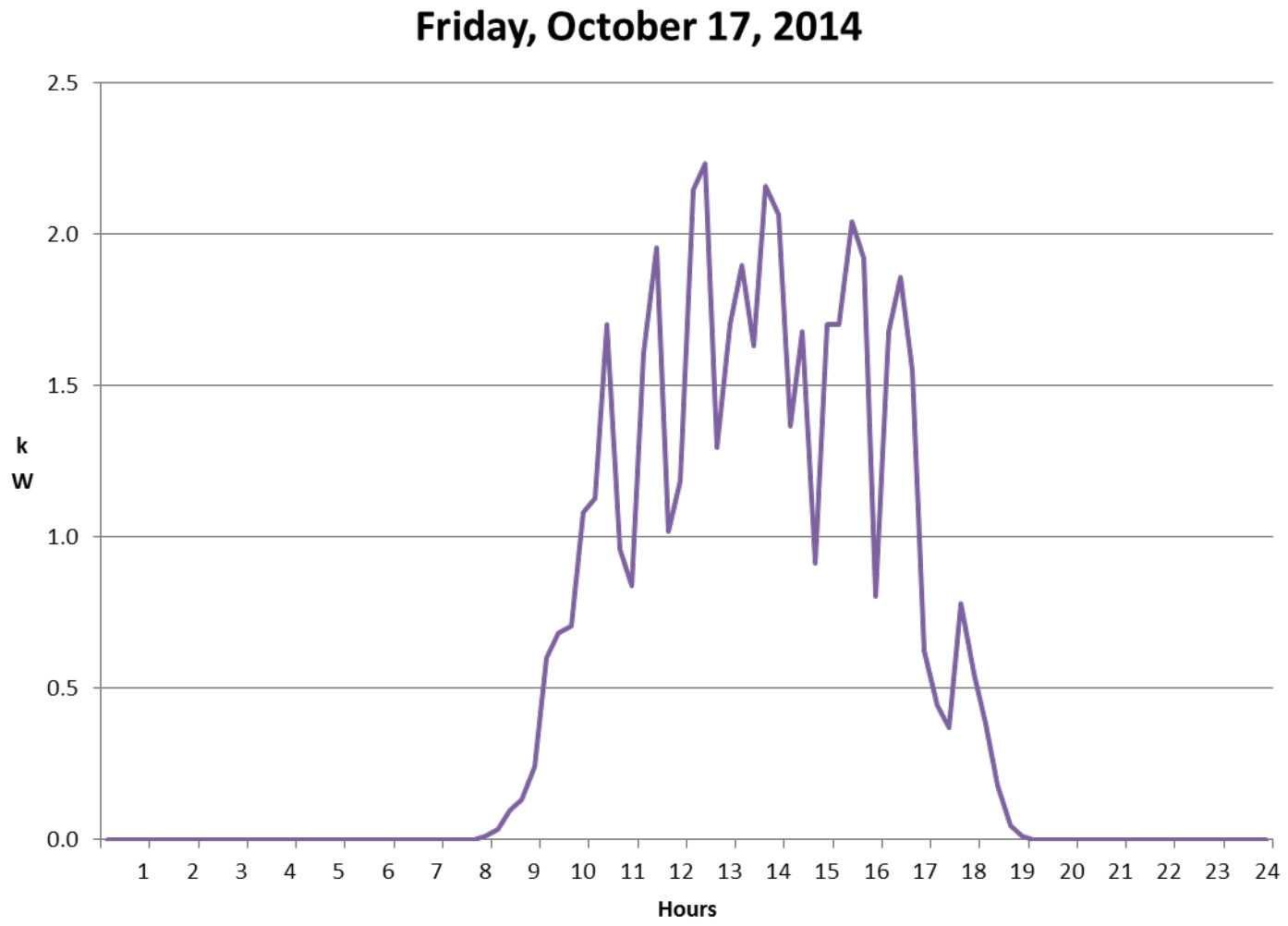
Sample Customer Production Meter Output



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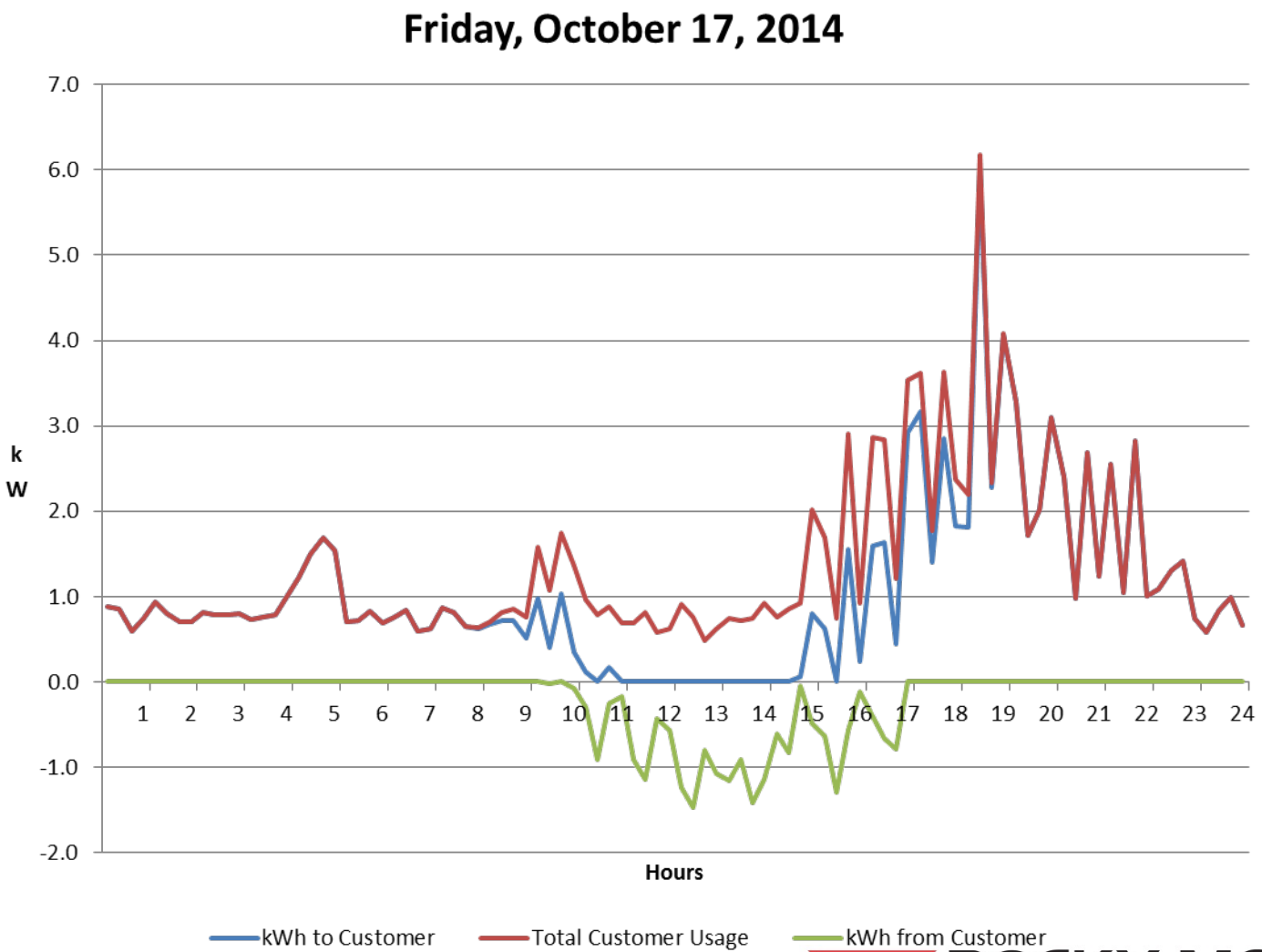
Sample Customer Net Meter Output



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The Sample Design

UTAH RESIDENTIAL DG LOAD STUDY DESIGN OPTION (2014)
FOUR STRATA, MEAN-PER-UNIT DESIGN

		a	b	c	d	e	f	g	h	i	j
		Sample Mean kW	Sample Mean kWh	Pop N	Variance of Mean	Standard Deviation	Wtd. Devtns. c*e	Proprtn. row f/ sum f	Optimal Allocation g*h total	Optimal with Attrition	Final with Attrition
STRATUM 1	0 -400 kWh		204.1	761	13409.6400	115.800	88124	0.2607	12	12	15
STRATUM 2	401 - 900 kWh		594.3	527	20107.2400	141.800	74729	0.2211	10	10	14
STRATUM 3	901 - 2,000 kWh		1,229.5	236	71022.2500	266.500	62894	0.1861	8	10	12
STRATUM 4	GT 2,000 kWh		3,317.1	54	4318915.2400	2078.200	112223	0.3321	15	15	21
EST POP MEAN (wtd by N)		0.000	594.298	1,578			337969	1.0000	45	47	62

	Sample Estimate	**Adj Sample Estimate**
	45	**62**

RELATIVE PRECISION OF SAMPLE KW ESTIMATE

		TOTAL KW Optimal n (col. h)	TOTAL KW Adjusted n (co	TOTAL KW Final (col. J	MEAN KW Adj. n
Variance contributed by strata:	1	694,849,754	694,849,754	543,766,649	279.046712
	2	608,710,945	608,710,945	418,154,803	244.453980
	3	545,937,890	420,893,636	341,320,020	169.027887
	4	649,688,250	649,688,250	384,815,348	260.910174
Total Variance		###########	###########	##########	953.438753
Standard Error		49991.86772	48725.17403	41085.9687	30.87780357
Desired Conf. Level		95%	95%	95%	95%
(z two tailed)		1.96	1.96	1.96	1.96
Conf. Interval		97984.06073	95501.34111	80528.4986	60.520495

Show White Sp

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Utah Load Research Study on Residential Net Metering Customers

- Initiated to gather specific time-based data to develop specific load profile data for use in cost of service study
- Installing load research meters for 15-minute interval data on production side and meter side

Utah		
±10 Precision @ 95% CI	COS Only	COS+Production
Population Size	2,068	2,068
# of Sample Meters Required	62	124
Cost of Installation	$24,767	$81,786
In Service Date	January 1st, 2015	

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Status of Meter Installations

Installation Status 11/4/2014					
	Total Sites	Customer Approvals Received	Meter Base Installed	Meters Exchanged	% Complete
Utah	63	39	24	12	19%

- Two “Requests for Approval” letters to install production meter base sent to initial selection group in August
- Third letter sent in September with $100 incentive
- Letters to all potential alternates sent in October

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Proposed Next Steps

- Q1 and Q2 2015 - Schedule Technical Workshops on the following topics:
  - Value/Benefits of Customer Generation
  - Impacts on Distribution Grid
  - Cost of Service Study and Potential Rate Designs
  - Net Metering with Non-Residential Rate Schedules

- Fall 2015 – Begin analyzing data collected through September 2015

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Questions?

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