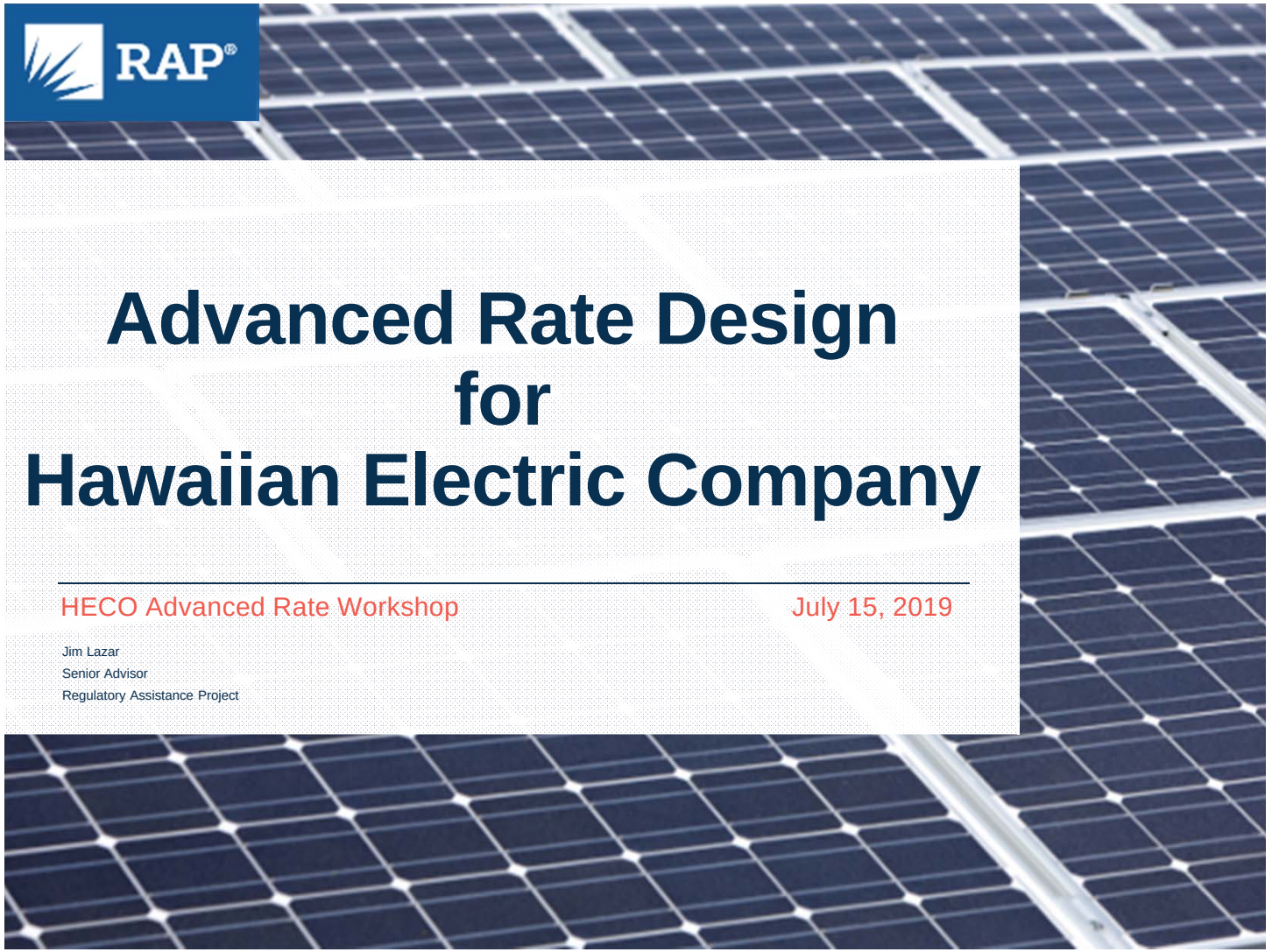


Advanced Rate Design for Hawaiian Electric Company

HECO Advanced Rate Workshop

July 15, 2019

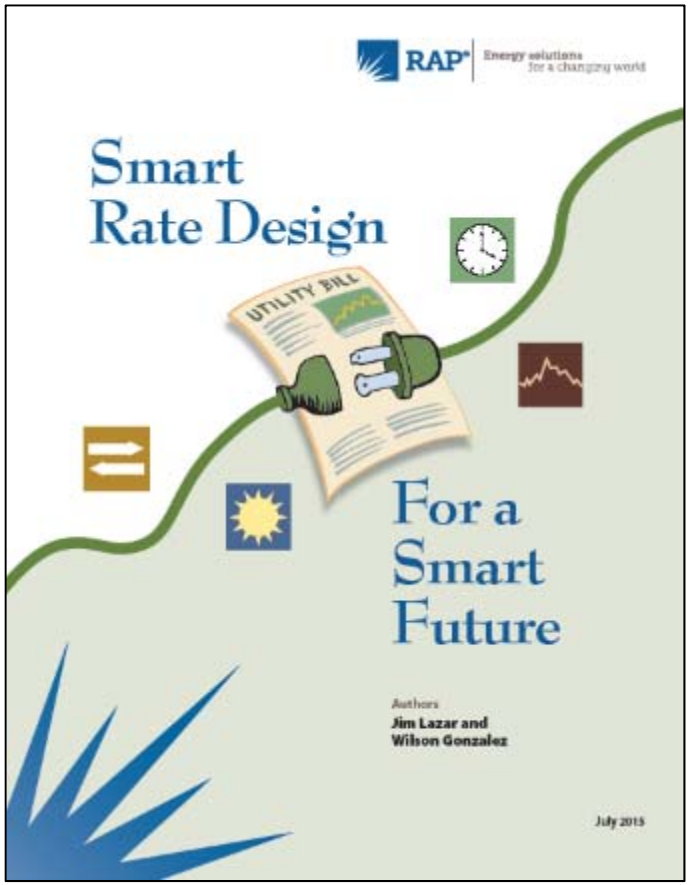
Jim Lazar
Senior Advisor
Regulatory Assistance Project

About Jim Lazar

- Economist
- Based in Olympia, Washington
- RAP senior advisor since 1998
- Consultant to Consumer Advocate and other Hawaii parties beginning in 1990.
- RAP engaged by Hawaii PUC on decoupling, PBR, and other issues.

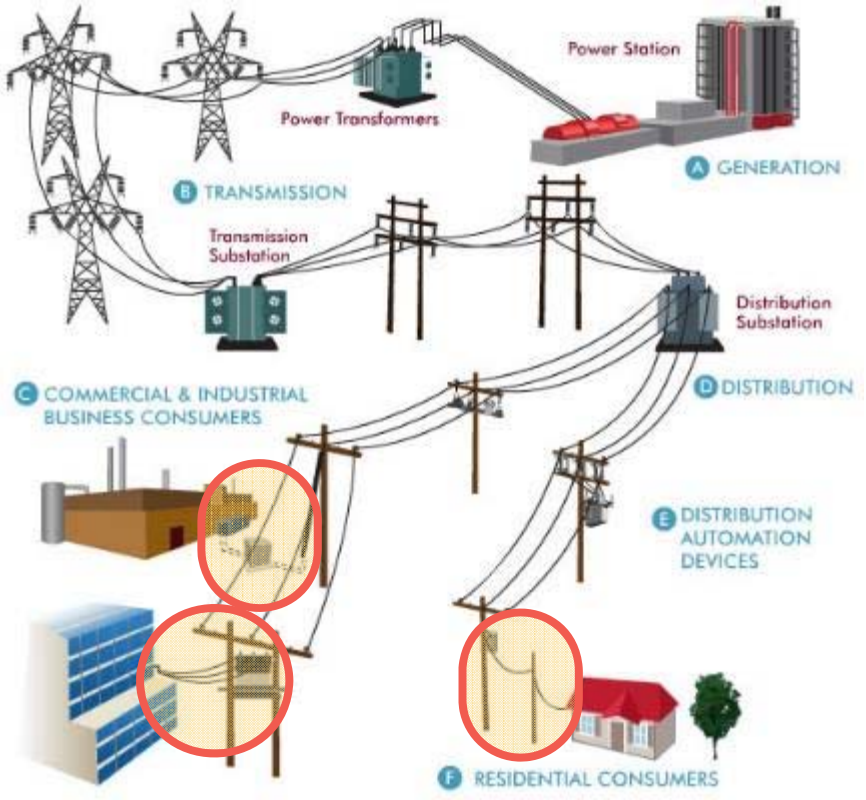
Overview of Presentation

- Principles of Smart Rate Design
- Customer Class Changes
- Residential Rate Design
- Commercial Rate Design
- Electric Vehicles


RAP
Energy solutions for a changing world
Smart Rate Design
UTILITY BILL
For a Smart Future
Authors
Jim Lazar and
Wilson Gonzalez
July 2015

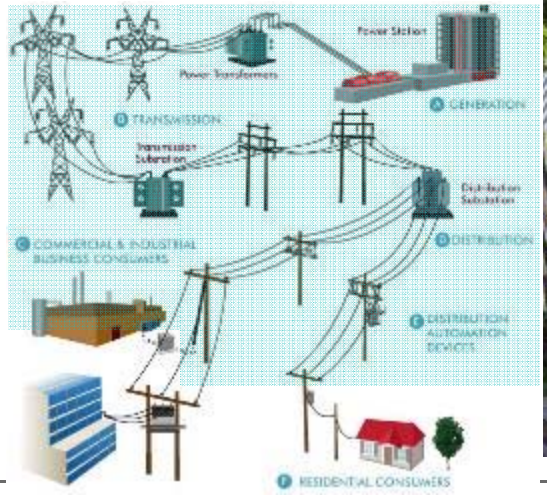
Principle #1

- A customer should be allowed to connect to the grid for no more than the cost of connecting to the grid.



Principle #2

Customers should pay for power supply and grid services in proportion to how much they use, and when they use it.



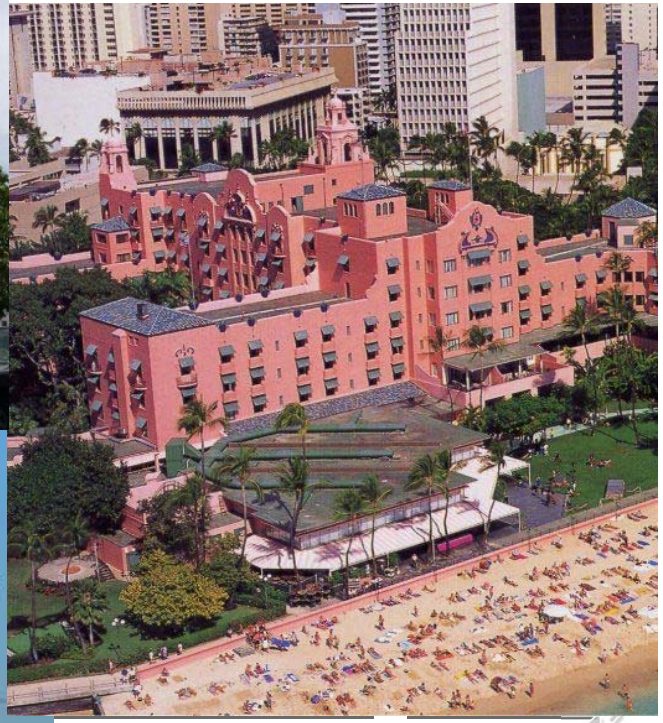
Principle #2

Customers should pay for power supply and grid services in proportion to how much they use, and when they use it.

Principle #3

Customers delivering power to the grid should receive full and fair value–no more and no less.

How Do Other Industries Recover Fixed Costs?



We Pay For Other “Grids” In Volumetric Prices

And They Are Happy To Have Our Business

Variable Costs are Disappearing – But costs are still driven by volume

An Example of a Smart Rate
EdF Critical Peak Pricing (Tempo)

Typical Dwelling Units	Contract power-rating (kVA)	Subscription Including Tax $/month
Small SF Home	9	$ 11.25
	12	$ 18.03
	15	$ 20.88
Large SF Home	18	$ 22.91
	30	$ 57.32
	36	$ 70.33

Non-Summer Days
- **On-Peak $.115**
- **Off-Peak $.097**

Summer Days
- **On-Peak $.16**
- **Off-Peak $.135**

Critical Days
- **On-Peak $.632**
- **Off-Peak $.243**

One Illustrative Smart Rate
Burbank Whole House EV (Optional)

- Customer Charge: $8.61/month
- Service Size Charge:
  - Small (multi-family) $1.36/month
  - Medium (most single-family) $2.73/month
  - Large (400 Amp +) $8.19/month

Energy Charge

Off-Peak	$.0812
Mid-Peak	$.1624
On-Peak (4-7 PM Summer)	$.2437

Customer Classes

- **Recommendation #1: Divide the residential class**
- **Single-family and multi-family customers are fundamentally different.**
  - **Multi-family:**
    - Very low distribution costs borne by HECO
    - Low usage per customer
    - Higher incidence of electric water heat

  - **Single-family:**
    - Higher distribution costs per customer and per kWh
    - More PV opportunity
    - More air conditioning
    - More peak-oriented usage

Future Rates for SF and MF Customers

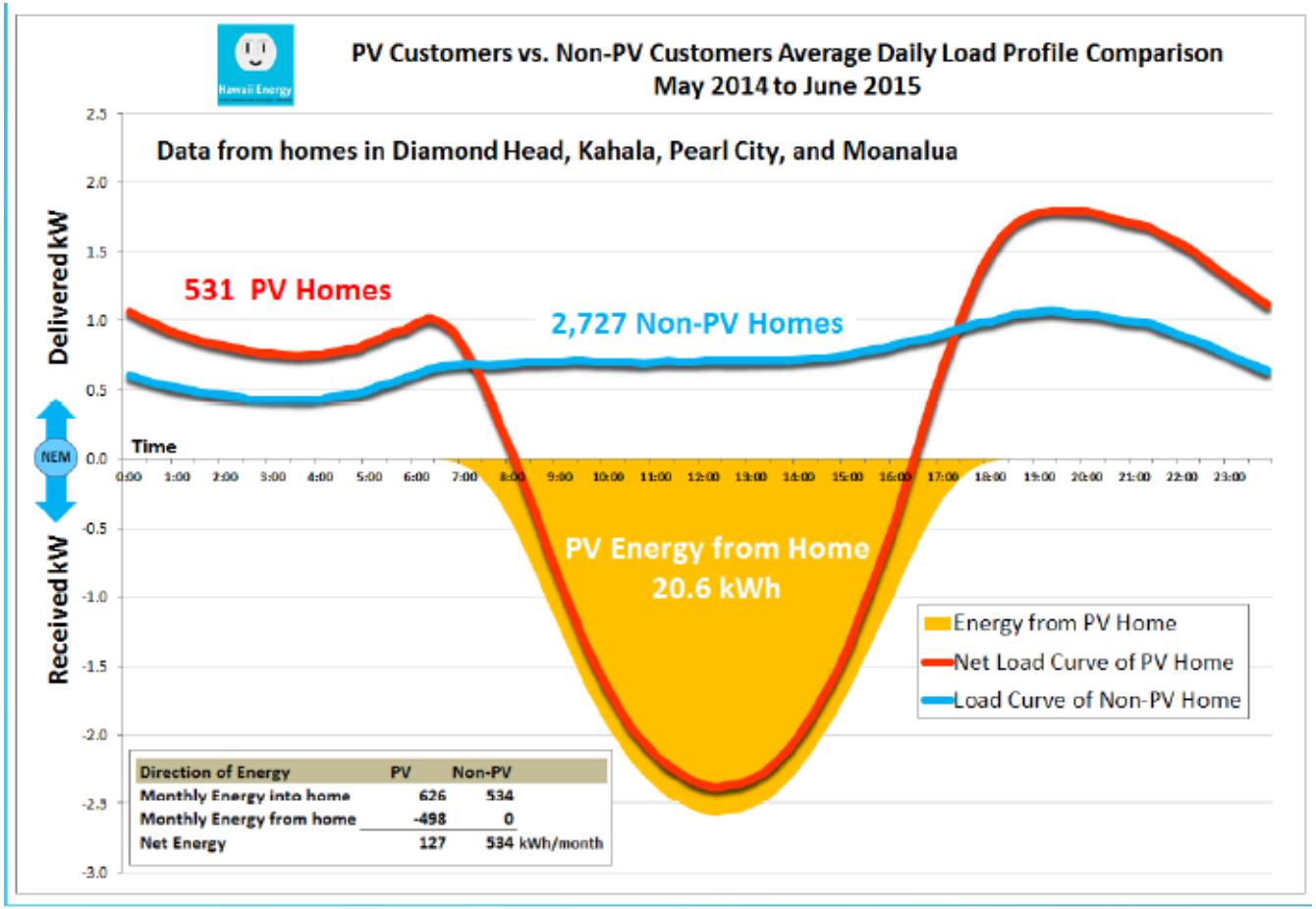
Multi-Family

Customer Charge:	$ 5.00
Site Infrastructure:	
$2.50/kW x 2	$ 5.00
Energy Charge:	
	$.30/kWh
Controlled water heater monthly bill credit:	~~($10.00)~~

Single-Family

Customer Charge:	$ 5.00
Site Infrastructure:	
$2.50/kW x 6	$ 15.00
Energy Charge:	
Off-Peak	$ .15
Mid-Peak	$ .30
On-Peak	$ .45
Critical Peak	$1.00

Effect of this rate on Solar Customers



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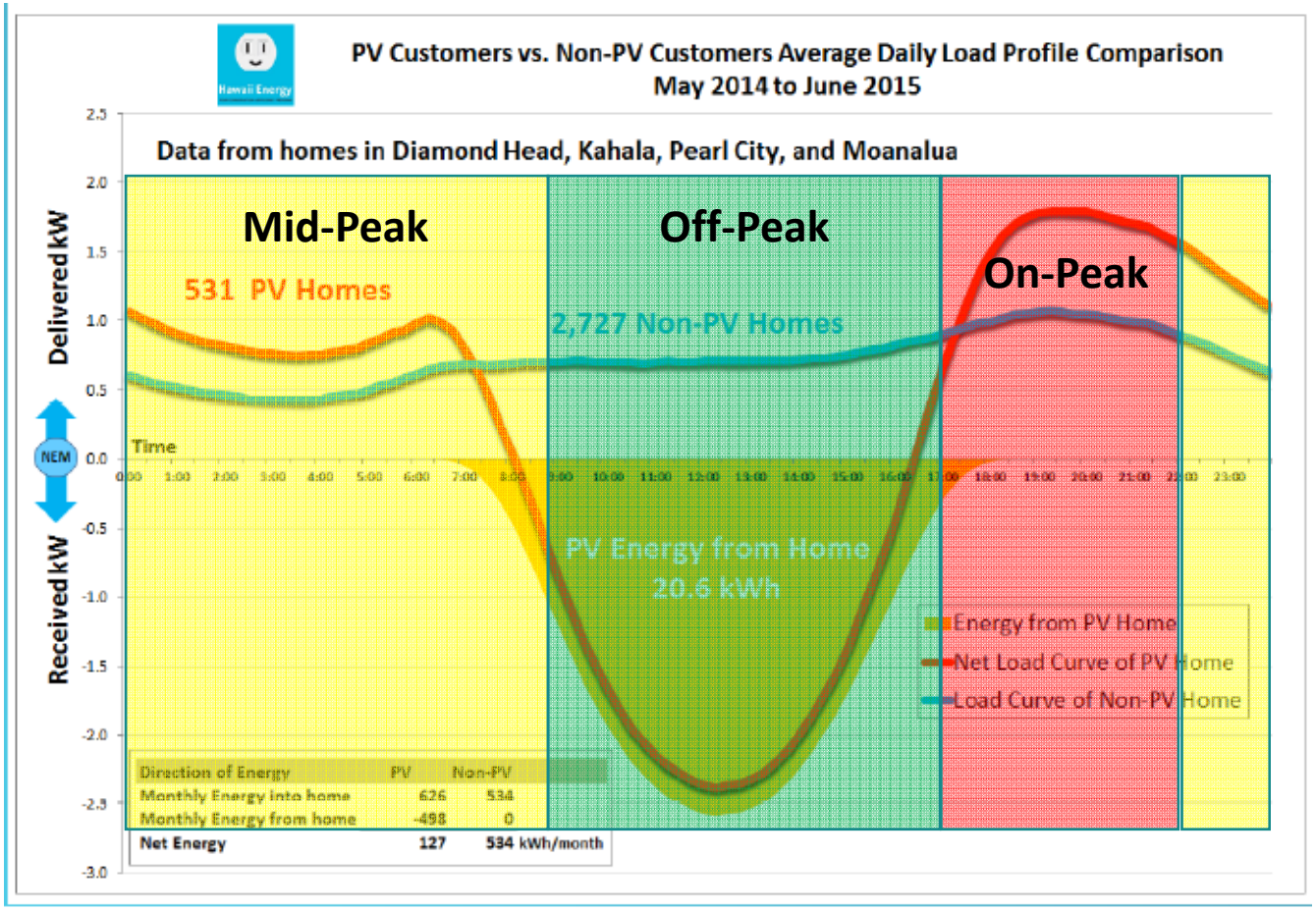


Impact: Solar customer with 0 kWh NEM

Rate Element	Amount	Unit	Period	Usage kWh	PV kWh	Net kWh
Customer	$ 11.50	Month		1		
Off-Peak	$ 0.153	kWh	9 AM - 5 PM	195.3	477	(281.70)
Mid-Peak	$ 0.345	kWh	All Other	198.6	42	156.60
On-Peak	$ 0.436	kWh	5-10 PM	140.1	15	125.10
				534	534	0.00

Impact: Solar customer with 0 kWh NEM

Rate Element	Amount	Unit	Period	Usage kWh	PV kWh	Net kWh	Billed Amount
Customer	$ 11.50	Month		1			$ 11.50
Off-Peak	$ 0.153	kWh	9 AM - 5 PM	195.3	477	(281.70)	$ (43.10)
Mid-Peak	$ 0.345	kWh	All Other	198.6	42	156.60	$ 54.03
On-Peak	$ 0.436	kWh	5-10 PM	140.1	15	125.10	$ 54.54
				534	534	0.00	$ 76.97

Non-Residential Rates

Current HECO Schedule J Rate

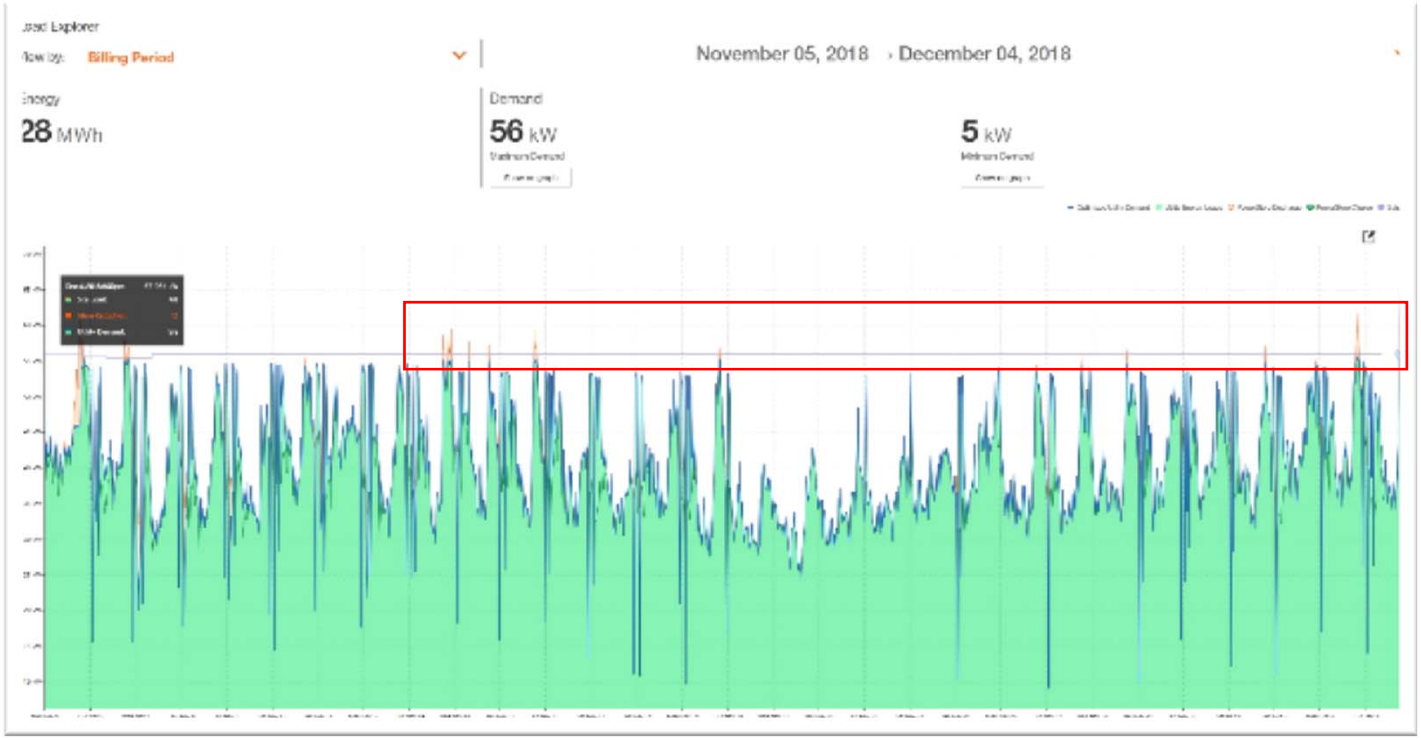
Charge	Amount	Unit
Customer	$66.00	Month
Demand	$13.00	kW (NCP)
Energy	$.2381	kWh

Problems with HECO Schedule J

- **Demand Charge:** Applies to NCP demand; irrelevant for system planning or system costs, except for site infrastructure at customer premises.
- **Energy Charge:** Not differentiated by time of use.
- **Invites battery installation** to shave demand charge – even at non-peak system hours.

Getting Around Demand Charges

STEM: 12 kW Savings Off 68 kW Peak



Rate design should make the choices the customer makes to minimize their own bill consistent with the choices they would make to minimize system costs.

Solution: Smart Rates

- **Demand Charge**:
  - Limit to site infrastructure **only**

- **Energy Charge**
  - Use same TOU principles as for residential rate

Example Smart Commercial Rate
SMUD GUS-M Rate (500 kW – 999 kW)

Charge	Amount	Unit
Customer	$109.05	Month
Site Infrastructure	$ 2.88	kW (NCP)
Super-Peak Demand	$ 7.05	Summer kW 2 – 8 PM **only**
Energy Charge	Summer $/kWh	Non-Summer $/kWh
Super-Peak	$0.1969	
On-Peak	$0.1356	$0.1039
Off-Peak	$0.1044	$0.0822

Concept Rate for HECO Schedule J

Charge	Amount	Unit
Customer	$66.00	Month
Site Infrastructure	$2.00	kW (NCP)
Off-Peak	$.15	kWh
Mid-Peak	$.30	kWh
On-Peak	$.45	kWh
Critical	$1.00	kWh

Electric Vehicles

- **Key Issues**
  - TOU Rates Work VERY Well
  - Residential: Need to avoid distribution upgrades
  - Workplace: Need to avoid high demand charges; concentrate charging in solar hours
  - Smart Charging works well.
- **Southern California Edison solution:**
  - 5-year “Demand Charge Holiday”
- **Pacific Gas and Electric solution:**
  - Small site infrastructure charge + TOU Energy Rate
- **Xcel Minnesota**: TOU and smart chargers = 96% off-peak.

Illustrative Rates Work Well for EVs

Single-Family

Customer Charge:	**$ 5.00**
Site Infrastructure:	
$2.50/kW x 6	**$ 15.00**
Energy Charge:	
Off-Peak	**$ .15**
Mid-Peak	**$ .30**
On-Peak	**$ .45**
Critical Peak	**$1.00**

Concept Rate for HECO Schedule J

Charge	Amount	Unit
Customer	$66.00	Month
Site Infrastructure	$2.00	kW (NCP)
Off-Peak	$.15	kWh
Mid-Peak	$.30	kWh
On-Peak	$.45	kWh
Critical	$1.00	kWh

Summary

- **Residential:**
  - Divide class single-family vs. multi-family
  - Provide water heater curtailment credit to multi-family
  - Move single-family to TOU / CPP soon.
- **Non-Residential**
  - Limit demand charges to site infrastructure
  - Recover all other system costs in TOU/CPP rates
- **Electric Vehicles**
  - Site infrastructure Charge + TOU/CPP works well

About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org