

Net Emissions Analysis Tool (NEAT) Working Group

*Formally the Residential Commercial Appliance Life
Cycle Analysis Working Group*

Meeting #3
Jan 31st, 2018



Summary of Submitted Comments and Edits Made to Residential NEAT Based on Recommendations

Scott A. Epstein Ph.D.

Planning and Rules Division



Development Progress

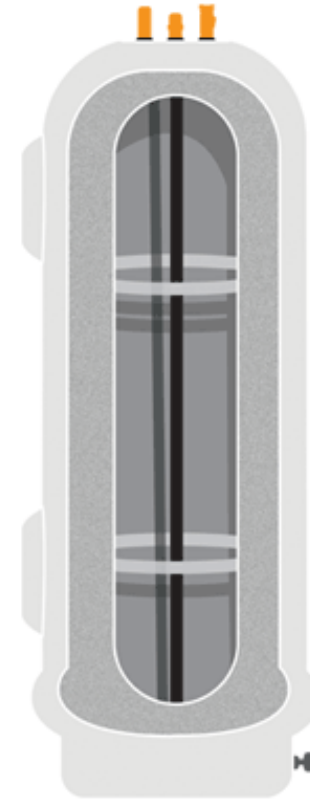
Residential NEAT	Not Yet Started	In Progress	Draft Complete	WG meeting #
Building of tool framework (GUI, file I/O)			X	2
Collection of input data			X	2
Demand segment of tool			X	2 and 3
Implementation of distributed solar			X	2
Implementation of distributed battery storage			X	Future
Electric Rate Calculator			X	3
Natural Gas Rate Calculator			X	Future
Implementation of net metering			X	3
Solar and battery cost calculator			X	Future
Electric generation emission factors		X		3
Gas leak and electricity transportation loss		X		Future
Results analysis tools		X		Future



Summary of Submitted Comments

Include thermal storage capabilities for electric water heaters

- *We plan on including an additional load profile to simulate thermal storage electric water heaters*
- *Looking for suggestions on a reliable data source*



energywisemn.com

Summary of Submitted Comments (continued)

Tie calculator more closely to other calculators used for retrofit rebates in California

- *NEAT is a macro-scale tool that is designed to model the behavior of the entire housing inventory in the SoCAB*
- *Staff evaluated the applicability of other tools such as CBECC-Res and SAM*
- *NEAT uses tools from NREL's SAM to model distributed solar energy and residential battery storage*
- *Staff is unaware of other macro-scale tools that can inform our analysis*



Summary of Submitted Comments (continued)

Specify the energy efficiency rating of each appliance

- *Different appliance categories use different efficiency metrics but UEC (annual energy use) is widely available and is commonly published for most appliances*
- *UEC for clothes washers, refrigerators, dishwasher, dryer, A/C and air source heat pumps, furnaces, etc. are all available on energystar.gov*
- *Converting between various efficiency metrics and UEC can be complicated and is beyond the scope of work*
- *UEC simplifies calculation of emissions*
- *We plan to continue using UEC as the main efficiency measure within NEAT*



Summary of Submitted Comments (continued)

Methodology recommendations for considering methane leakage

- Consider fugitive methane along all stages of the lifecycle of natural gas: exploration, production, processing, storage, transmission, distribution, end use
- Time horizon for GWP calculations
- Several citations for methane leak quantification provided
- *Currently working on this module. Plan to present at next working group meeting.*
- *References on in-home leak rates needed*



Summary of Submitted Comments (continued)

Update list of appliances for scenario implementation to include the most efficient appliances available

- *Determining the optimal appliance for inclusion is non-trivial. Combination of efficiency, installation cost, and use profile must be considered*
- *Best appliance models change frequently*
- *We plan to include a comprehensive list of technologies that go beyond 2009 RASS study, but it will be up to the user to input cost and efficiency parameters*
 - *Significant changes implemented in tool to address this concern (details in subsequent slides)*



Edits in “Demand” Module

Residential Net Emissions Analysis Tool version 1.2 beta

Demand Intermediate Results Power Supply Economics placeholder1 placeholder2 Computation Results Results Summary

Housing Category: Single-Family Multi-Family Mobile Home Aggregate

Climate Zone: 6 Coastal 8 S. Near-Coastal 9 N. Near-Coastal 10 S. Inland 15 S. Desert 16 Mountain All [CZ MAP](#)

Populate Baseline and Scenario Technology Mix Parameters

Load Default Parameters Load Saved Parameters

Populate List of New Technologies for Possible Implementation

Load Default Parameters Load Saved Parameters *Edit parameters in "Add Technology for Scenario Selection" and implement with "Replace Technology Tool"*

Hot water heating Kitchen Laundry Miscellaneous Pool Space heating and cooling Transportation

BASELINE TECHNOLOGY MIX PARAMETERS										SCENARIO TECHNOLOGY MIX PARAMETERS							
Fuel	Technology	UEC	NOX EF	CO2e EF	Unit Cost	Install Cost	Lifetime	Penetration		Fuel	Technology	UEC	NOX EF	CO2e EF	Unit Cost	Install Cost	Lifetime
A Electric	Water Heat	2468	0	0	368	1700	13	0.074		Electric	Water Heat	2468	0	0	368	1700	13
B Electric	Solar Water Heat with Electric Backup	1964	0	0	1411	3869	13	0		Electric	Solar Water Heat with Electric Backup	1964	0	0	1411	3869	13
C NatGas	Conventional Water Heater	193	0.0023	11.76	653	1900	13	0.716		NatGas	Conventional Water Heater	193	0.0023	11.76	653	1900	13
D NatGas	Solar Water Heat with Gas Backup	163	0.0023	11.76	4349	3869	13	0		NatGas	Solar Water Heat with Gas Backup	163	0.0023	11.76	4349	3869	13

*List of “New Technology Parameters”
Ability to save and load values*

#	Fuel	Technology	Profile	UEC	NOX EF	CO2e EF	Unit Cost	Install Cost	Lifetime	Notes
1	Electric	Water Heat	Water Heating	2468.4	0	0	368.01	1700	13	General technology cat...
2	Electric	Solar Water Heat with Electric Backup	Water Heating	1963.7	0	0	1410.5	3869	13	General technology cat...
3	NatGas	Conventional Water Heater	Water Heating	192.97	0.0023	11.76	653.27	1900	13	General technology cat...
4	NatGas	Solar Water Heat with Gas Backup	Water Heating	162.78	0.0023	11.76	4348.5	3869	13	General technology cat...
5	NatGas	Whole House Tankless System	Water Heating	-9999	-9999	-9999	-9999	-9999	-9999	Values not specified
6	NatGas	High-Efficiency Condensing	Water Heating	-9999	-9999	-9999	-9999	-9999	-9999	Values not specified
7	Electric	Heat Pump	Water Heating	-9999	-9999	-9999	-9999	-9999	-9999	Values not specified
8	Electric	Standard Tank	Water Heating	-9999	-9999	-9999	-9999	-9999	-9999	Values not specified
9	Electric	Point of Use Tankless System	Water Heating	0000	0000	0000	0000	0000	0000	Values not specified

Save Baseline and Scenario Technology Mix Parameters to File

Replace Technology Tool

(All households with the baseline technology will switch to the replacement tech.)

Select baseline technology to phase-out:

Select technology to use instead:

Implement

ADVANCE TO NEXT

Add Technology Save List of New Technologies to File



Additional Alternative Technologies Identified by the Workgroup

HOT WATER HEATING	
Fuel	Technology
NatGas	Solar Water Heat with Gas Backup
NatGas	Standard Tank
NatGas	Whole House Tankless System
NatGas	High-Efficiency Condensing
Electric	Heat Pump
Electric	Standard Tank
Electric	Solar Water Heat with Electric Backup
Electric	Whole House Tankless System
Electric	Point-of-Use Tankless System

KITCHEN	
Fuel	Technology
Electric	Range Oven Combination
Electric	Dishwasher
Electric	First Refrigerator
Electric	Second Refrigerator
Electric	Freezer
Electric	Microwave
NatGas	Range Oven Combination

LAUNDRY	
Fuel	Technology
Electric	Dryer
Electric	Clothes Washer
NatGas	Dryer



Additional Alternative Technologies Identified by the Workgroup

MISCELLANEOUS	
Fuel	Technology
Electric	TV
Electric	Outdoor Lighting
Electric	Home Office
Electric	PC
Electric	Well Pump
Electric	Other
NatGas	Other

POOL	
Fuel	Technology
Electric	Spa Heat
Electric	Pool Pump
Electric	Spa
NatGas	Spa Heat
NatGas	Pool Heat

SPACE HEATING AND COOLING	
Fuel	Technology
NatGas	Central Forced Air Furnace
NatGas	Floor or Wall Furnace
NatGas	Hot Water Gas Radiator
NatGas	Gas Fireplace
Electric	Resistance Heater
Electric	Central Foreced Air Furnace
Electric	Central Heat Pump
Electric	Through-The-Wall Heat Pump
Electric	Portable Heater
Electric	Furnace Fan
Electric	Attic Ceiling Fan
Electric	Central Air Conditioning
Electric	Room Air Conditioning
Electric	Evaporative Cooler

Edits in “Demand” Module

Old Approach

- Calculate the change in emissions and costs for the average household in each climate zone and classification
- Rates are non-linear so errors are introduced by taking average

New Approach

- Simulate a set of 1500* households for each climate zone and classification
- Simulated set matches user-defined penetration
- Perform entire calculation for every household



Edits in “Demand” Module

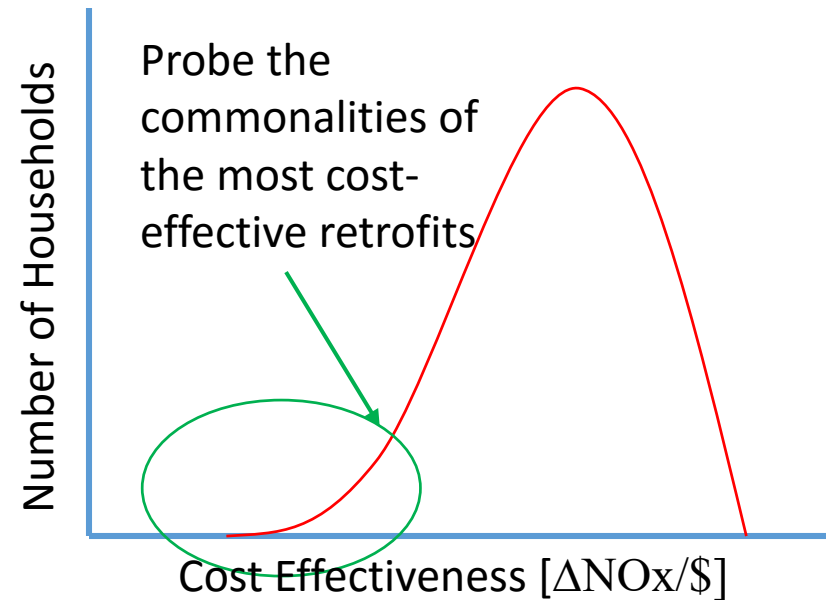
1. User defines current mix of technology, penetration, Units of Energy Consumption, install cost, and lifetime
2. User defines scenario technologies for retrofit (ie all households with tech A replace with tech B), UEC, install cost, lifetime, presence of solar
3. Tool randomly generates 1500 homes with appliances that match user-defined penetration to serve as baseline
4. In “scenario”, tool implements user-defined replacements



Edits in “Demand” Module

- New approach will lead to a histogram of cost-effectiveness

CZ = 6, Single Family Homes, So Cal Edison, So Cal Gas



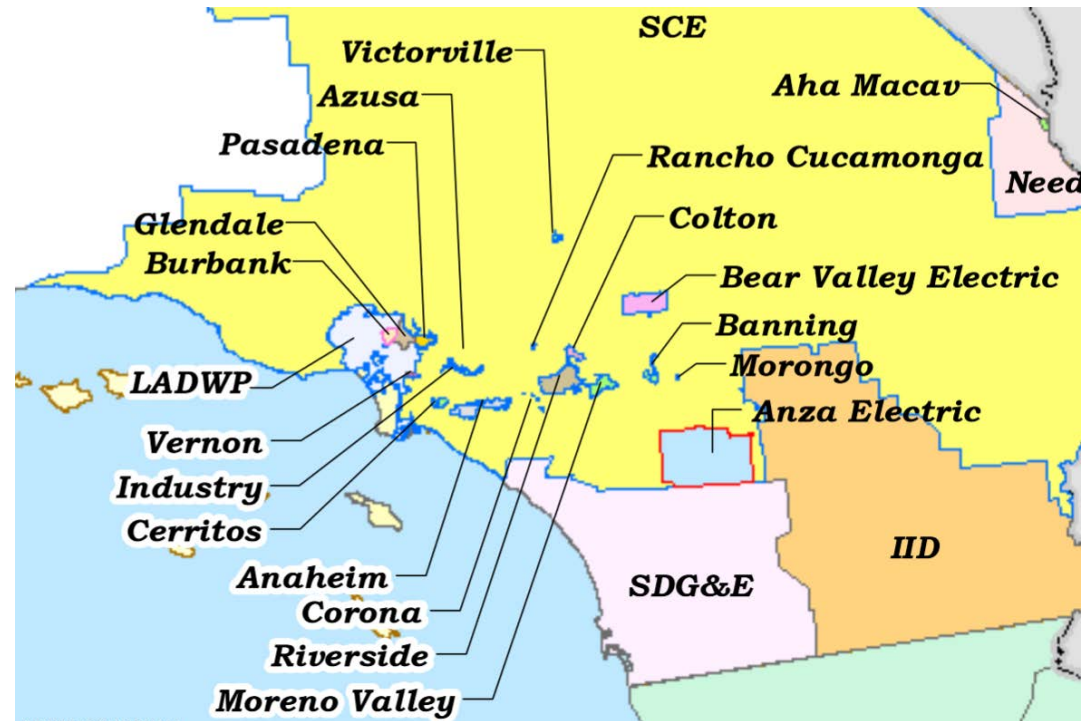
Calculation of Electric Rates and the Embedded Electric Rate Structure Editor Tool

Scott A. Epstein Ph.D.
Planning and Rules Division



Electric Rate Structures

- Many electric utilities within the Basin
- Many different rate structures for each utility
- Analyzed census data and utility jurisdiction data to determine number of households in each utility, climate zone, category



Electric Rate Structure

Number of Households in CZ 9	CZ = 9	CZ = 9	CZ = 9	All CZ
	SingleFamily	MultiFamily	MobileHome	TOTAL
Azusa Light & Power	1453.9	791.57	49.576	2295.1
Bear Valley Electric Service	0	0	0	16359
Burbank Water & Power	19282	24245	52.118	43580
City of Anaheim Public Utilities Department	0	0	0	1.03E+05
City of Banning Electric Department	0	0	0	2954
City of Corona Department of Water & Power	0	0	0	761.97
City of Riverside	0	0	0	77001
City of Vernon Municipal Light Department	2.4413	2.2593	0.028312	812.92
Glendale Water & Power	27502	48678	92.233	76272
Los Angeles Department of Water & Power _Zone1	56310	1.85E+05	579.69	5.22E+05
Los Angeles Department of Water & Power _Zone2	2.94E+05	4.28E+05	4893.8	8.60E+05
Moreno Valley Utility	0	0	0	16832
Pasadena Water & Power	25104	32425	179.32	57709
Rancho Cucamonga Municipal Utility	0	0	0	846
San Diego Gas & Electric	0	0	0	1.17E+05
Southern California Edison	5.63E+05	2.83E+05	20457	3.60E+06

Electric Rate Structure Editor Tool

- Separate tool linked from NEAT
- Allows users to graphically view and edit electric rates
- Tool populated with default values but everything is editable
 - Choose rate to use for single family, multi family, mobile homes
 - Choose rate to use for net metering
 - Choose rate to use for each climate zone (So Cal Edison)
- Utility rates from OpenEI Utility Rate Database



Electric Rate Structure Editor Tool

Ability to view/edit rates
from every utility in SoCAB

Rate Selector | Analysis

Select Utility: Southern California Edison | Next Utility | + Add Custom Rate

Select a Rate to view Period Codes and Rate Schedule: | Previous Utility | Store Revised Check Marks

Rate	Zone	SingleFam	MultiFam	MobileHome	NetMeter
Domestic Service: D - Baseline Region 13	13	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 9	9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 8	8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 10	10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 14	14	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 16	16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 15	15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 14	14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 13	13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 10	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 9	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 8	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 6	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 5	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 6	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 5	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 15	15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 16	16	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T-Region 5	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 6	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 8	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 9	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T-Region 10	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 13	13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 14	14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 15	15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 16	16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic (NEM 2.0): TOU-D-A	all	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Time-of-use Tiered Domestic (NEM 2.0): TOU-D-B	all	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Rate Structure Selector and Editor tool initialized at 17-Jan-2018 08:48:23. Select a rate to view and edit.

Time-of-use Tiered Domestic: TOU-D-T - Region 6

Weekday Rates | Weekend Rates

Period Codes

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
J	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
F	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
M	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
A	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
M	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
J	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
J	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
A	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
S	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
O	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
N	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
D	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0

Hour

Period 0 | Period 1 | Period 2 | Period 3 | Period 4 | Period 5

Rate information shown for selected period. NaN indicates no rate or maximum at that tier.

	Tier1	Tier2	Tier3	Tier4	Tier5
Maximum monthly Usage [kW-hr]	379.6	NaN	NaN	NaN	NaN
Rate [\$/kW-hr]	0.17515	0.21332	NaN	NaN	NaN
Adjustment Rate [\$/kW-hr]	0	0	0	0	0

Power Access Charge (PAC) | Store Edited Rate Values

PAC Defined | Edit/View PAC | Store Edited PAC

RESET ALL TO DEFAULT | LOAD ALL FROM FILE | SAVE ALL TO FILE



Electric Rate Structure Editor Tool

Electricity Rate Structure Selector and Editor

Rate Selector Analysis

Select Utility: Southern California Edison

Select a Rate to view Period Codes and Rate Schedule:

Rate	Zone	SingleFam	MultiFam	MobileHome	NetMeter
Domestic Service: D - Baseline Region 13	13	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 9	9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 8	8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 10	10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 14	14	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 16	16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 15	15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 14	14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 13	13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 10	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 9	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 8	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 6	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 5	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 6	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 5	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 15	15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 16	16	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T-Region 5	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 6	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 8	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 9	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T-Region 10	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 13	13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 14	14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 15	15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 16	16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic (NEM 2.0): TOU-D-A	all	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Time-of-use Tiered Domestic (NEM 2.0): TOU-D-B	all	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Time-of-use Tiered Domestic: TOU-D-T - Region 6

Weekday Rates Weekend Rates

Period Codes

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
J	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
F	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
M	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
A	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
M	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
J	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
J	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
A	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
S	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
O	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0
N	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0
D	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0

Hour

Period 0 Period 1 Period 2 Period 3 Period 4 Period 5

Rate information shown for selected period. NaN indicates no rate or maximum at that tier.

	Tier1	Tier2	Tier3	Tier4	Tier5
Maximum monthly Usage [kW-hr]	379.6	NaN	NaN	NaN	NaN
Rate [\$/kW-hr]	0.17515	0.21332	NaN	NaN	NaN
Adjustment Rate [\$/kW-hr]	0	0	0	0	0

Power Access Charge (PAC)

PAC Defined Edit/View PAC Store Edited PAC

Store Edited Rate Values

RESET ALL TO DEFAULT LOAD ALL FROM FILE SAVE ALL TO FILE

Clicking on a specific rate pulls up additional information on right

Rate Structure Selector and Editor tool initialized at 17-Jan-2018 08:48:23. Select a rate to view and edit.

Electric Rate Structure Editor Tool

User can add a custom rate

Electricity Rate Structure Selector and Editor

Rate Selector Analysis

Select Utility: Southern California Edison

Next Utility: + Add Custom Rate

Previous Utility: Store Revised Check Marks

Select a Rate to view Period Codes and Rate Schedule:

Rate	Zone	SingleFam	MultiFam	MobileHome	NetMeter
Domestic Service: D - Baseline Region 13	13	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 9	9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 8	8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 10	10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 14	14	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 16	16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 15	15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 14	14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 13	13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 10	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 9	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 8	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 6	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 5	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 6	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 5	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 15	15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 16	16	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T-Region 5	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 6	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 8	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 9	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T-Region 10	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 13	13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 14	14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 15	15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 16	16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic (NEM 2.0): TOU-D-A	all	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Time-of-use Tiered Domestic (NEM 2.0): TOU-D-B	all	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Time-of-use Tiered Domestic: TOU-D-T - Region 6

Weekday Rates Weekend Rates

Period Codes

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
J	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
F	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
M	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
A	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
M	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
J	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
J	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
A	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
S	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
O	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0
N	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0
D	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0

Hour

Edit Period Codes

Period 0 Period 1 Period 2 Period 3 Period 4 Period 5

Rate information shown for selected period. NaN indicates no rate or maximum at that tier.

	Tier1	Tier2	Tier3	Tier4	Tier5
Maximum monthly Usage [kW-hr]	379.6	NaN	NaN	NaN	NaN
Rate [\$/kW-hr]	0.17515	0.21332	NaN	NaN	NaN
Adjustment Rate [\$/kW-hr]	0	0	0	0	0

Power Access Charge (PAC)

Store Edited Rate Values

PAC Defined Edit/View PAC Store Edited PAC

RESET ALL TO DEFAULT LOAD ALL FROM FILE SAVE ALL TO FILE

Rate Structure Selector and Editor tool initialized at 17-Jan-2018 08:48:23. Select a rate to view and edit.



Electric Rate Structure Editor Tool

Electricity Rate Structure Selector and Editor

Rate Selector Analysis

Select Utility: Southern California Edison

Next Utility + Add Custom Rate

Previous Utility Store Revised Check Marks

Select a Rate to view Period Codes and Rate Schedule:

Rate	Zone	SingleFam	MultiFam	MobileHome	NetMeter
Domestic Service: D - Baseline Region 13	13	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 9	9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 8	8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 10	10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 14	14	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 16	16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 15	15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 14	14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 13	13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 10	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 9	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 8	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 6	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 5	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 6	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 5	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 15	15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 16	16	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T-Region 5	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 6	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 8	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 9	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T-Region 10	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 13	13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 14	14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 15	15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 16	16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic (NEM 2.0): TOU-D-A	all	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Time-of-use Tiered Domestic (NEM 2.0): TOU-D-B	all	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Time-of-use Tiered Domestic: TOU-D-T - Region 6

Weekday Rates Weekend Rates

Period Codes

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
J	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
F	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
M	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
A	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
M	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
J	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
J	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
A	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
S	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
O	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0
N	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0
D	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0

Hour

Edit Period Codes

Period 0 Period 1 Period 2 Period 3 Period 4 Period 5

Rate information shown for selected period. NaN indicates no rate or maximum at that tier.

	Tier1	Tier2	Tier3	Tier4	Tier5
Maximum monthly Usage [kW-hr]	379.6	NaN	NaN	NaN	NaN
Rate [\$/kW-hr]	0.17515	0.21332	NaN	NaN	NaN
Adjustment Rate [\$/kW-hr]	0	0	0	0	0

Power Access Charge (PAC)

PAC Defined Edit/View PAC Store Edited PAC

Store Edited Rate Values

RESET ALL TO DEFAULT LOAD ALL FROM FILE SAVE ALL TO FILE

User can decide which rate is used for each category with check boxes

Rate Structure Selector and Editor tool initialized at 17-Jan-2018 08:48:23. Select a rate to view and edit.

Electric Rate Structure Editor Tool

Ability to edit rates and tiers for each period. Power access charges also included

Electricity Rate Structure Selector and Editor

Rate Selector Analysis

Select Utility: Southern California Edison

Select a Rate to view Period Codes and Rate Schedule:

Rate	Zone	SingleFam	MultiFam	MobileHome	NetMeter
Domestic Service: D - Baseline Region 13	13	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 9	9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 8	8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 10	10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 14	14	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 16	16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 15	15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 14	14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 13	13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 10	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 9	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 8	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 6	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 5	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 6	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 5	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 15	15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 16	16	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T-Region 5	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 6	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 8	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 9	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T-Region 10	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 13	13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 14	14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 15	15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 16	16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic (NEM 2.0): TOU-D-A	all	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Time-of-use Tiered Domestic (NEM 2.0): TOU-D-B	all	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Time-of-use Tiered Domestic: TOU-D-T - Region 6

Weekday Rates Weekend Rates

Period Codes

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
J	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
F	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
M	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
A	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
M	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
J	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
J	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
A	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
S	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
O	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
N	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
D	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0

Hour

Period 0 Period 1 Period 2 Period 3 Period 4 Period 5

Rate information shown for selected period. NaN indicates no rate or maximum at that tier.

	Tier1	Tier2	Tier3	Tier4	Tier5
Maximum monthly Usage [kW-hr]	379.6	NaN	NaN	NaN	NaN
Rate [\$/kW-hr]	0.17515	0.21332	NaN	NaN	NaN
Adjustment Rate [\$/kW-hr]	0	0	0	0	0

Power Access Charge (PAC)

PAC Defined Edit/View PAC Store Edited PAC

Store Edited Rate Values

RESET ALL TO DEFAULT LOAD ALL FROM FILE SAVE ALL TO FILE

Rate Structure Selector and Editor tool initialized at 17-Jan-2018 08:48:23. Select a rate to view and edit.



Electric Rate Structure Editor Tool

Electricity Rate Structure Selector and Editor

Rate Selector Analysis

Select Utility: Southern California Edison

Select a Rate to view Period Codes and Rate Schedule:

Rate	Zone	SingleFam	MultiFam	MobileHome	NetMeter
Domestic Service: D - Baseline Region 13	13	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 9	9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 8	8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 10	10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 14	14	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 16	16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 15	15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 14	14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 13	13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 10	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 9	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 8	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 6	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-Of-Use Domestic Tiered Electric Vehicle Charging -TOU-D-TEV, Region 5	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 6	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 5	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 15	15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Domestic Service: D - Baseline Region 16	16	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T-Region 5	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 6	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 8	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 9	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T-Region 10	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 13	13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 14	14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 15	15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic: TOU-D-T - Region 16	16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time-of-use Tiered Domestic (NEM 2.0): TOU-D-A	all	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Time-of-use Tiered Domestic (NEM 2.0): TOU-D-B	all	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Time-of-use Tiered Domestic: TOU-D-T - Region 6

Weekday Rates Weekend Rates

Period Codes

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
J	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
F	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
M	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
A	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
M	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
J	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
J	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
A	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
S	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2
O	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
N	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
D	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0

Hour

Period 0 Period 1 Period 2 Period 3 Period 4 Period 5

Rate information shown for selected period. NaN indicates no rate or maximum at that tier.

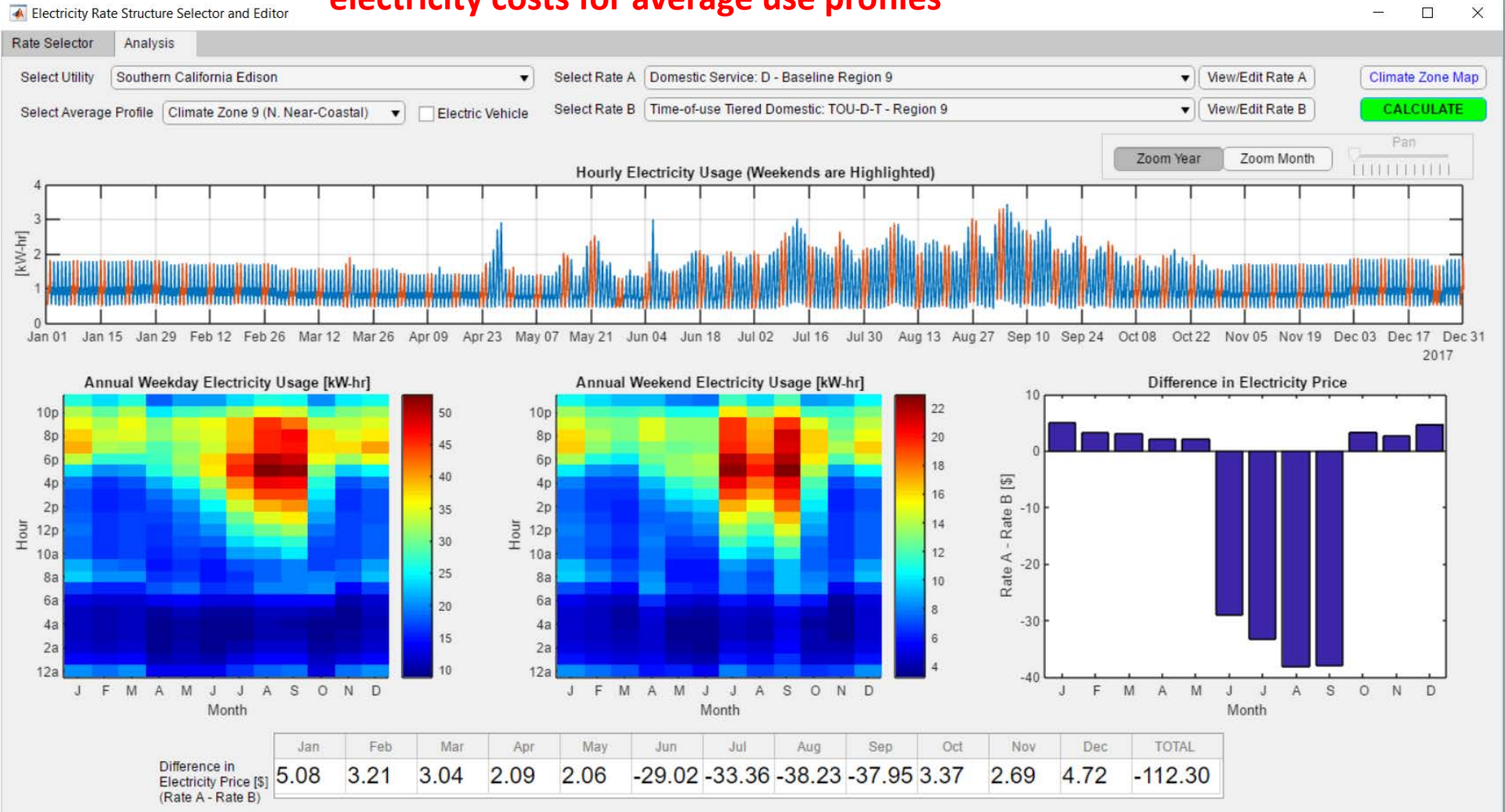
	Tier1	Tier2	Tier3	Tier4	Tier5
Maximum monthly Usage [kW-hr]	379.6	NaN	NaN	NaN	NaN
Rate [\$ /kW-hr]	0.17515	0.21332	NaN	NaN	NaN

Comprehensive input and output tools so that revised rates can be used in NEAT directly

RESET ALL TO DEFAULT LOAD ALL FROM FILE SAVE ALL TO FILE

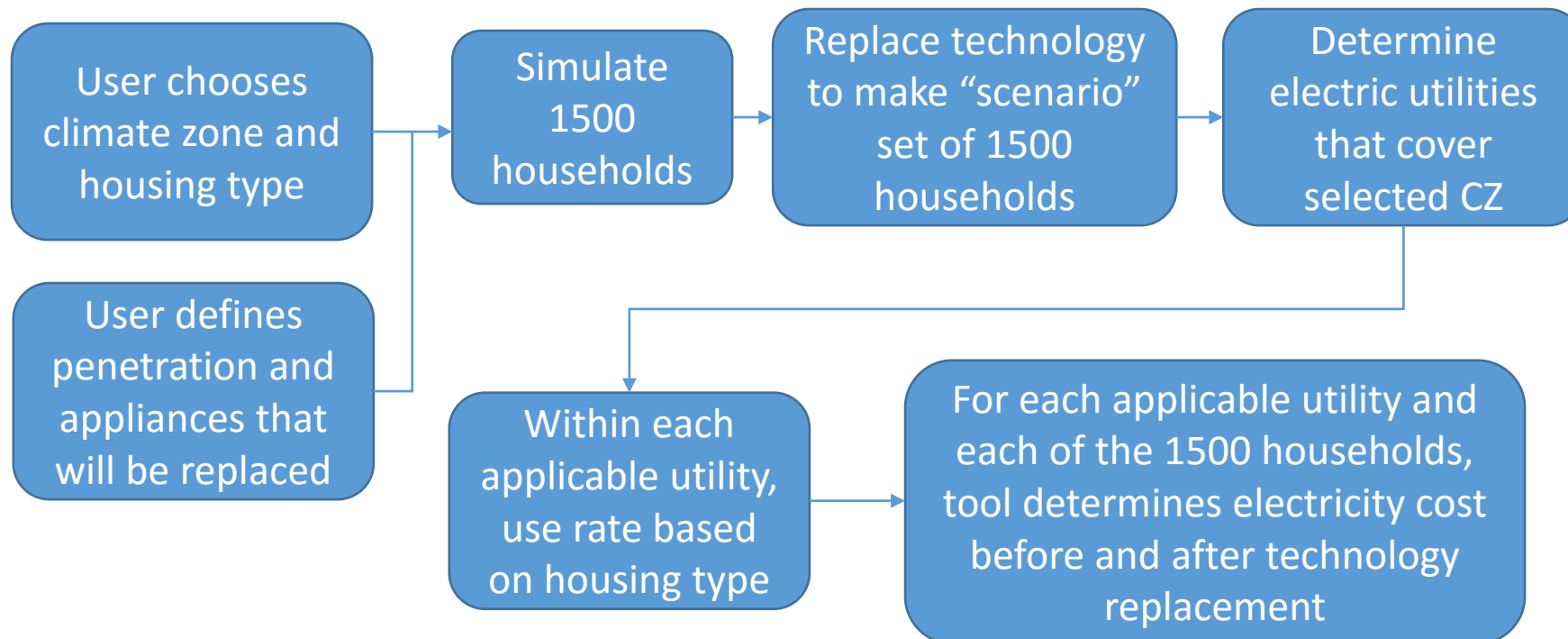
Electric Rate Structure Editor Tool

Analysis tool included to compare electricity costs for average use profiles



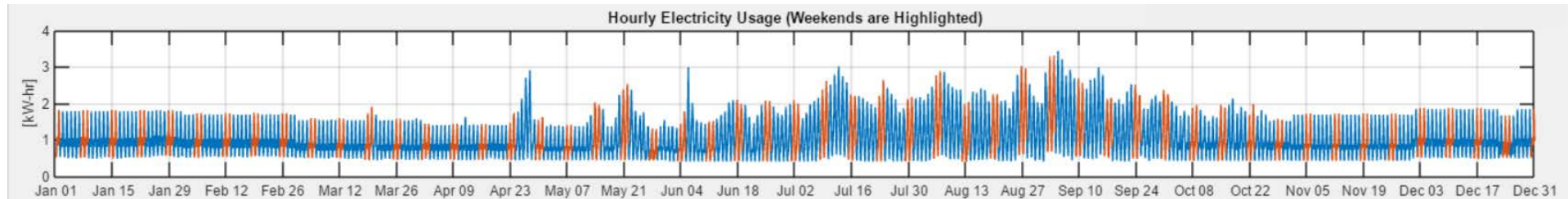
Calculation of Electricity Rates

- For each of the 1500 simulated homes, electricity costs must be calculated before and after retrofit

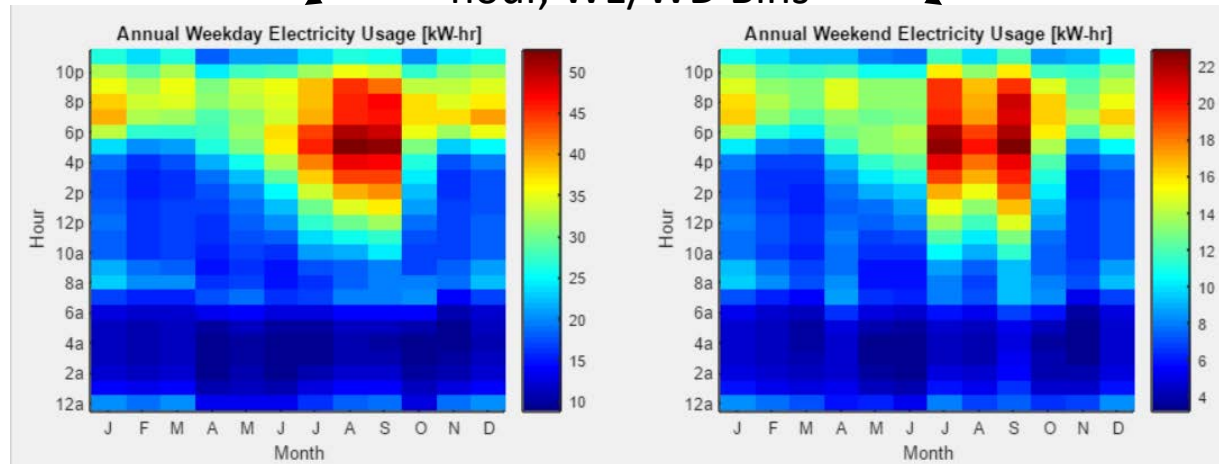


Calculation of Electricity Rates

For Each Household:



Aggregate
use into month,
hour, WE/WD Bins



Calculation of Electricity Rates

For each utility in the selected Climate Zone and each utility rate in the selected Housing Category:

Apply Period Codes to each month, hour, WE/WD

Weekday Period Codes

	J	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0		
	F	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0		
	M	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0		
	A	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0		
	M	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0		
Month	J	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2		
	J	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2		
	A	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2		
	S	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2		
	O	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0		
	N	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0		
	D	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
			Hour																							

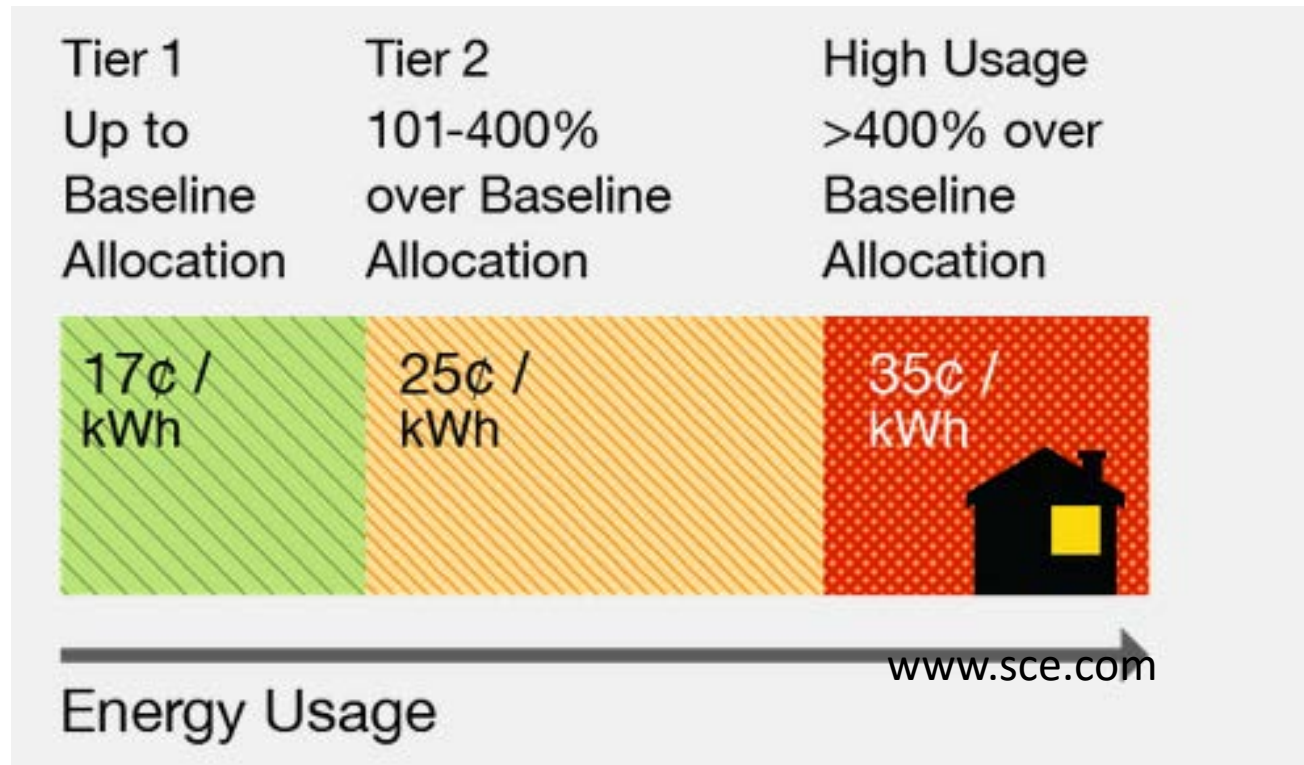
Weekend Period Codes

	J	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Month	J	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	J	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	A	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	S	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	O	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
			Hour																							



Calculation of Electricity Rates

For utilities without flat rates, each period code has a set of tiers with a Maximum monthly usage and a corresponding rate:



Calculation of Electricity Rates

- Monthly usage is allocated between the tiers and multiplied by the rate of each tier to generate a monthly electricity charge
- Power access charges are added for selected utilities (LADWP)
- Only variable charges are calculated. Difference calculations make fixed charges irrelevant.



Treatment of Net Metering

Net Metering

(default) Sell Electricity Back to Grid at Retail Rates

Sell Electricity Back to Grid at Fixed Rate (specify)

- Residential solar panels may generate excess electricity
- Two options available if net metering is selected
 - Sell electricity back to the grid at retail
 - Uses the same rates for purchasing electricity unless specified otherwise in Electric Rate Structure Editor Tool
 - Sell electricity to grid at a fixed rate determined by the user

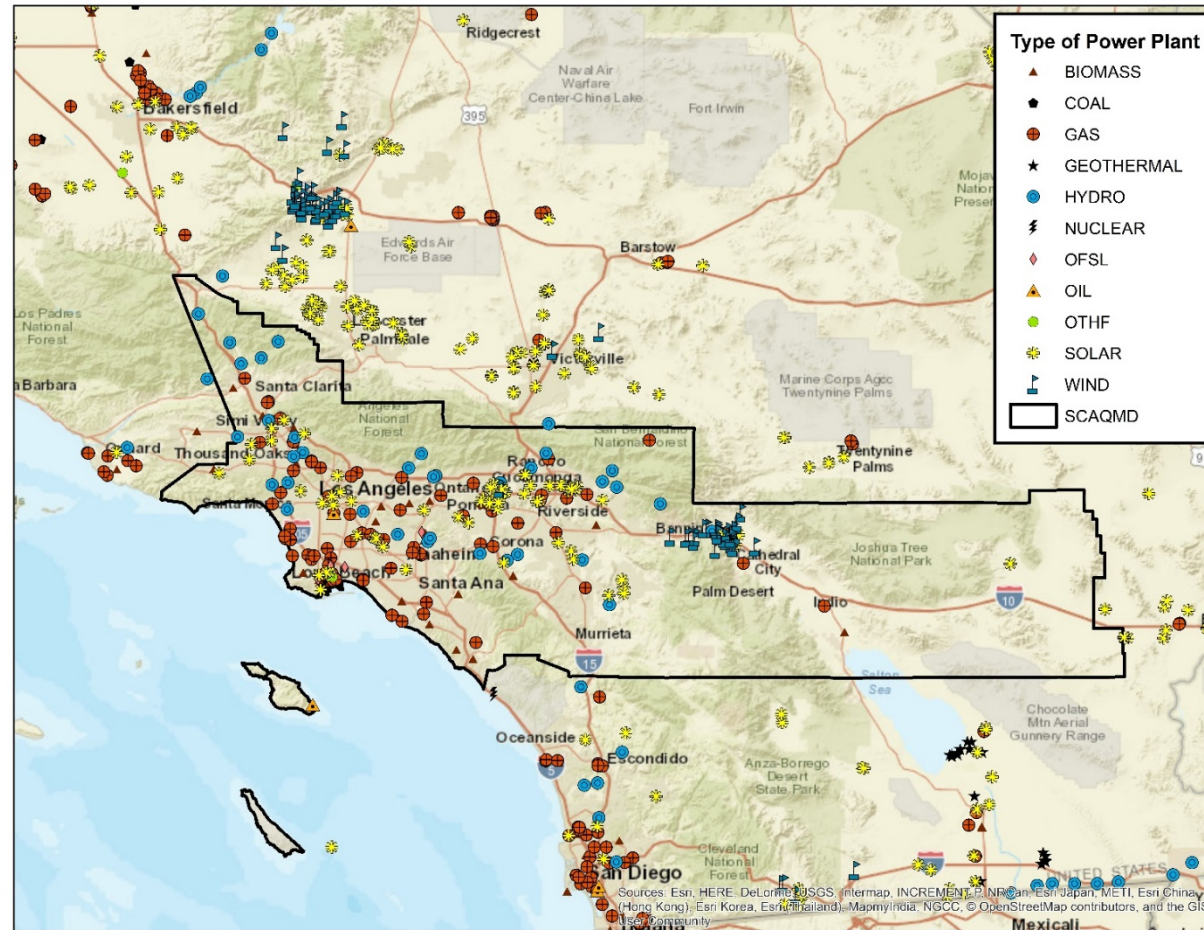
Electricity Generation Emissions

Marc Carreras-Sospedra Ph.D.

Planning and Rules Division



Electricity Generation in SoCal



Plant data from eGRID database for 2012 with size > 1MW:

<https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid>



Electricity Generation Emission Factor Options

Electricity Generation

Emission Factor of INCREASED Electricity Use	Emission Factor of REDUCED Electricity Use
<input type="radio"/> All additional electricity from centralized photovoltaics	<input checked="" type="radio"/> Reductions in electricity generation emissions determined with the average grid emission factor
<input checked="" type="radio"/> All additional electricity provided at the average grid emission factor	<input type="radio"/> Reductions in electricity generation emissions arise by curtailing peaker plant emissions
<input type="radio"/> All additional electricity provided by peaker plants	<input type="radio"/> Grid emission factor changes modeled with HiGRID
<input type="radio"/> Grid emission factor changes modeled with HiGRID	

[Electricity Generation Module Documentation](#)

Emissions from Photovoltaics

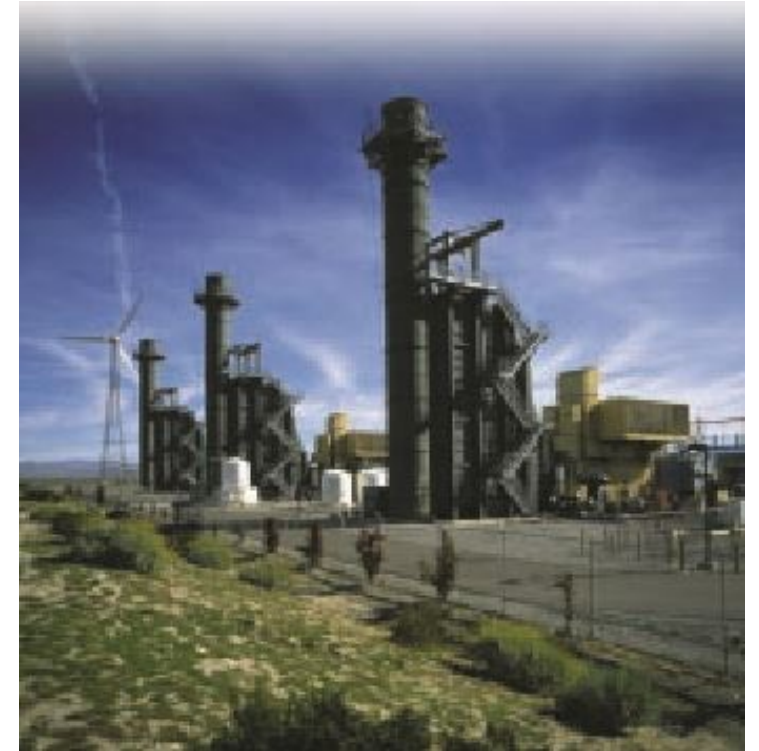
- Zero emissions from additional electricity generation
- Best case scenario for an increase in electricity demand



Source: zkenergy.com

Emissions from Peaker Plants

- Changes in electricity met by peaker plants
 - Emissions at 0.08-0.24 lbs/MWh NO_x (from permit data)
- Worst case scenario for an increase in electricity demand
- Best case scenario for a decrease in electricity demand



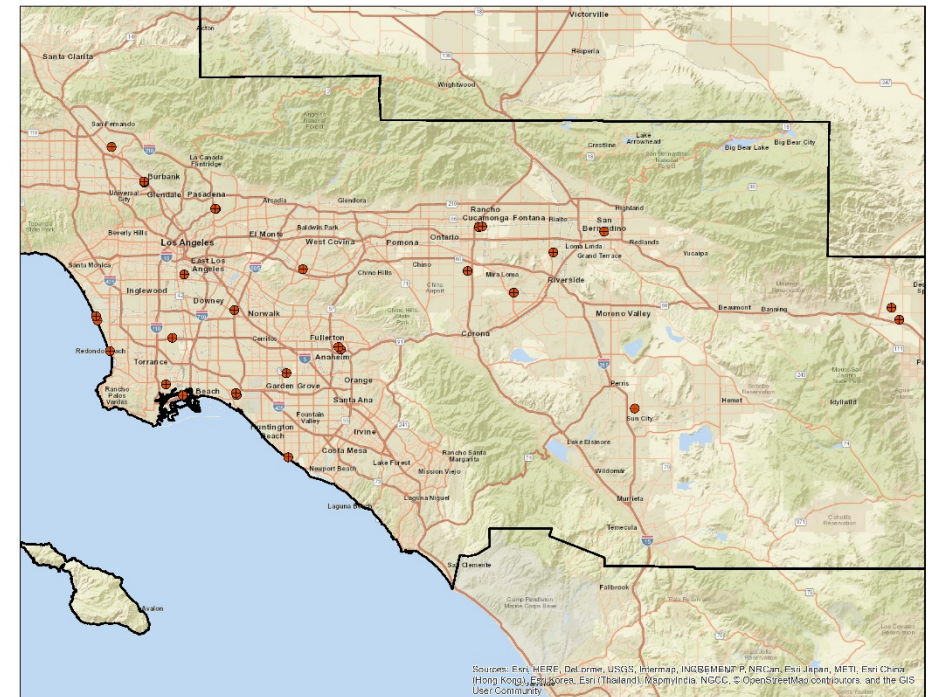
Emissions from Average Grid

- We assume changes in electricity will be met by the marginal grid
- For California, we assume marginal electricity is generated from dispatchable units, which are NG units
- Hourly load and emissions are obtained from the Continuous Emissions Monitoring system (Air Markets Program Data, <https://ampd.epa.gov/ampd/>)



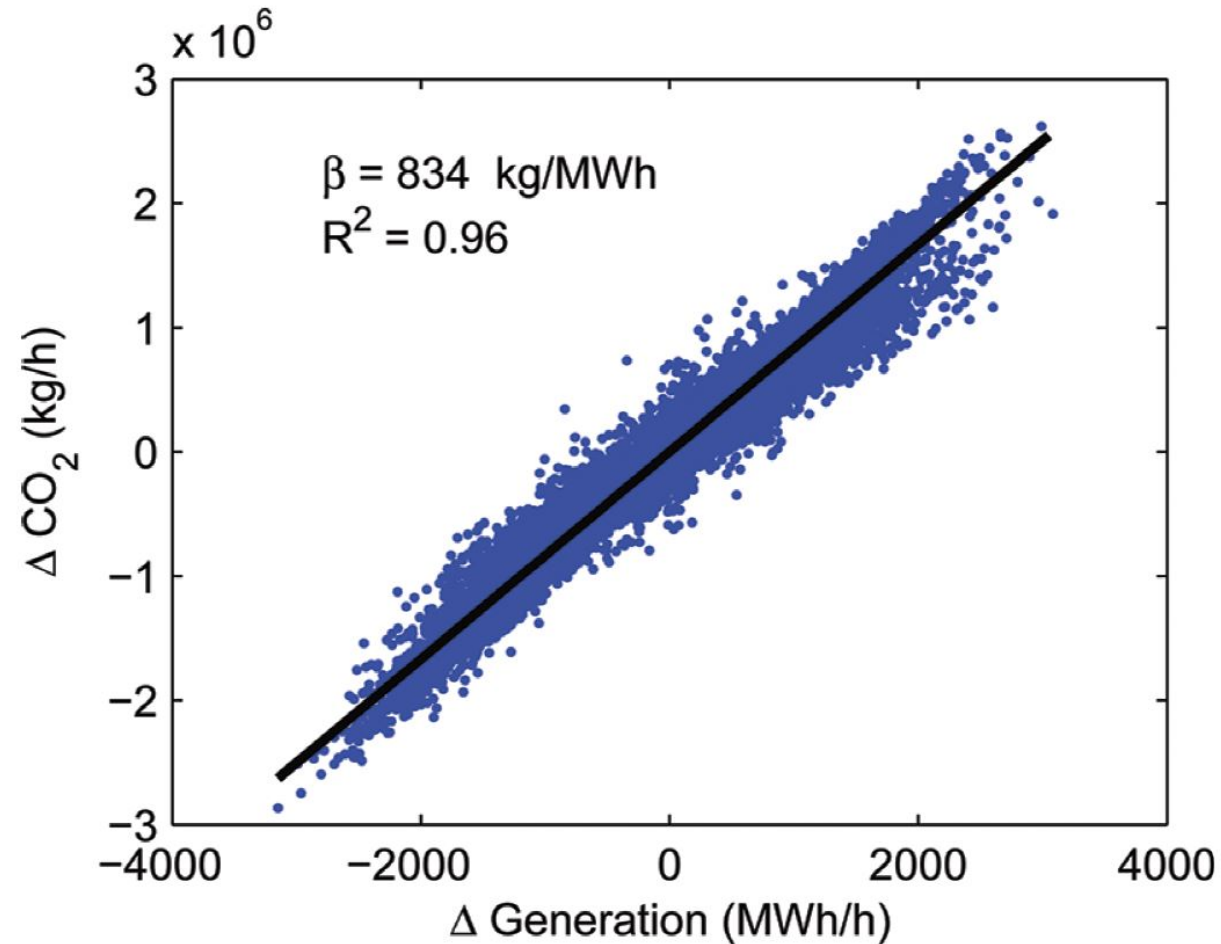
Power Plant Data Availability

- Data availability for hourly emissions and throughput data:
 - Hourly data available from 2005 to 2017
 - 30 facilities in the basin for NOX emissions
 - 111 in the entire state for CO₂ emissions



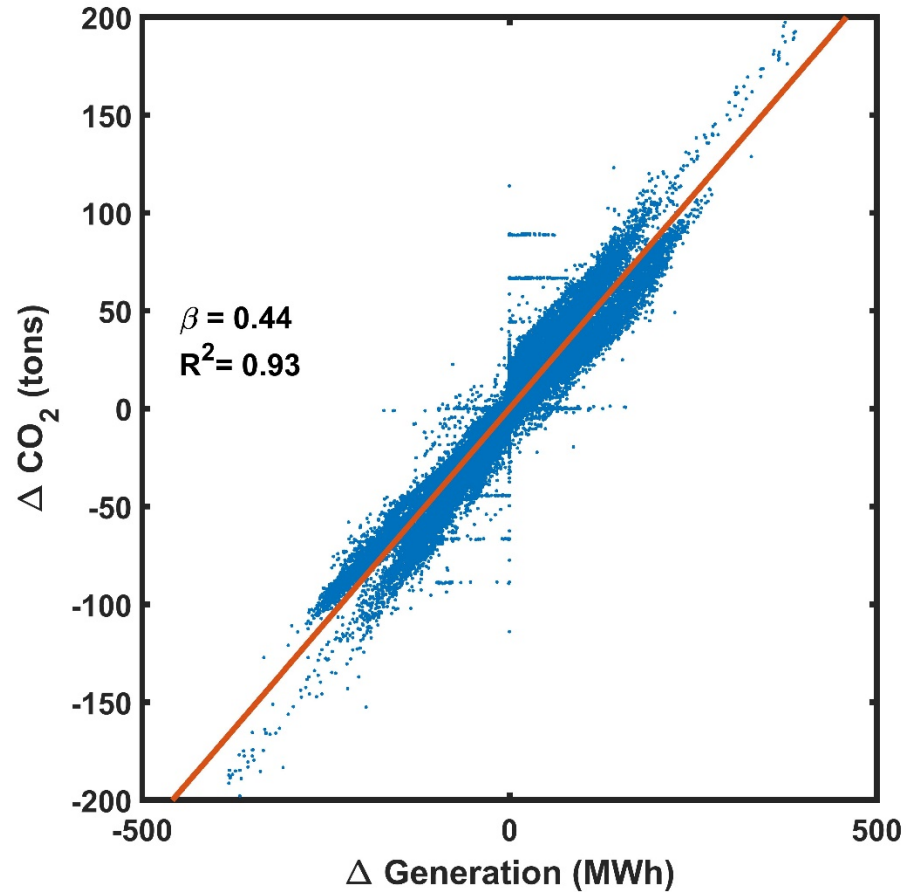
Methodology for Marginal Emissions

Methodology based on peer-reviewed work (Siler-Evans et al., 2012)

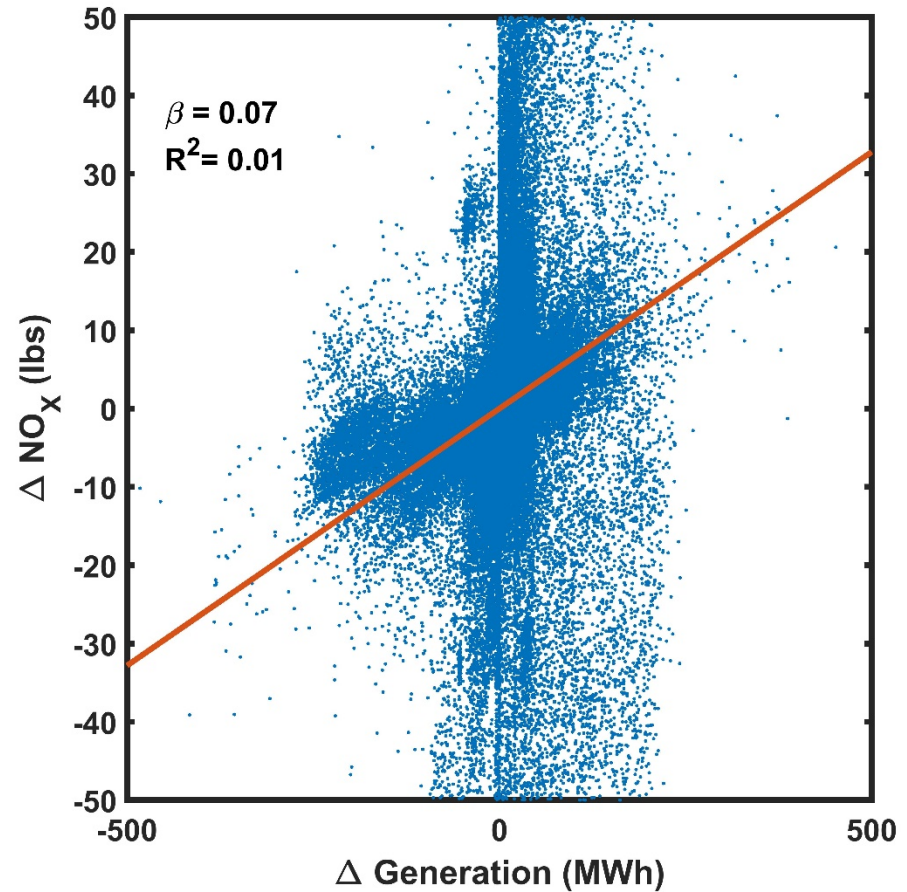


Sample Analysis for 2012 in SoCal

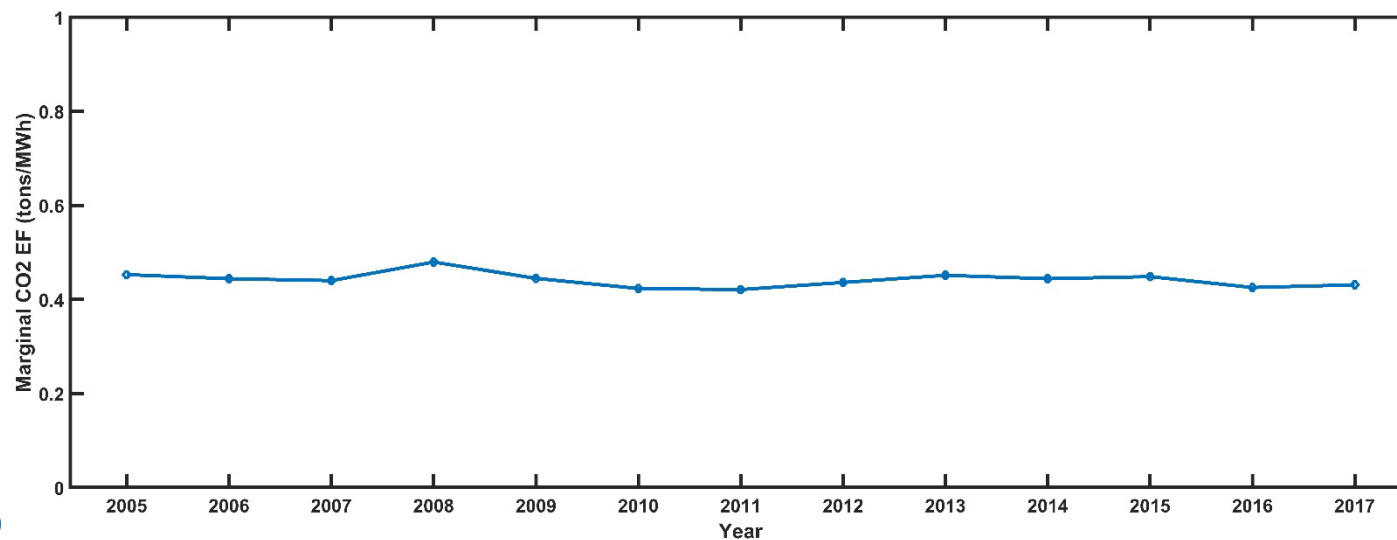
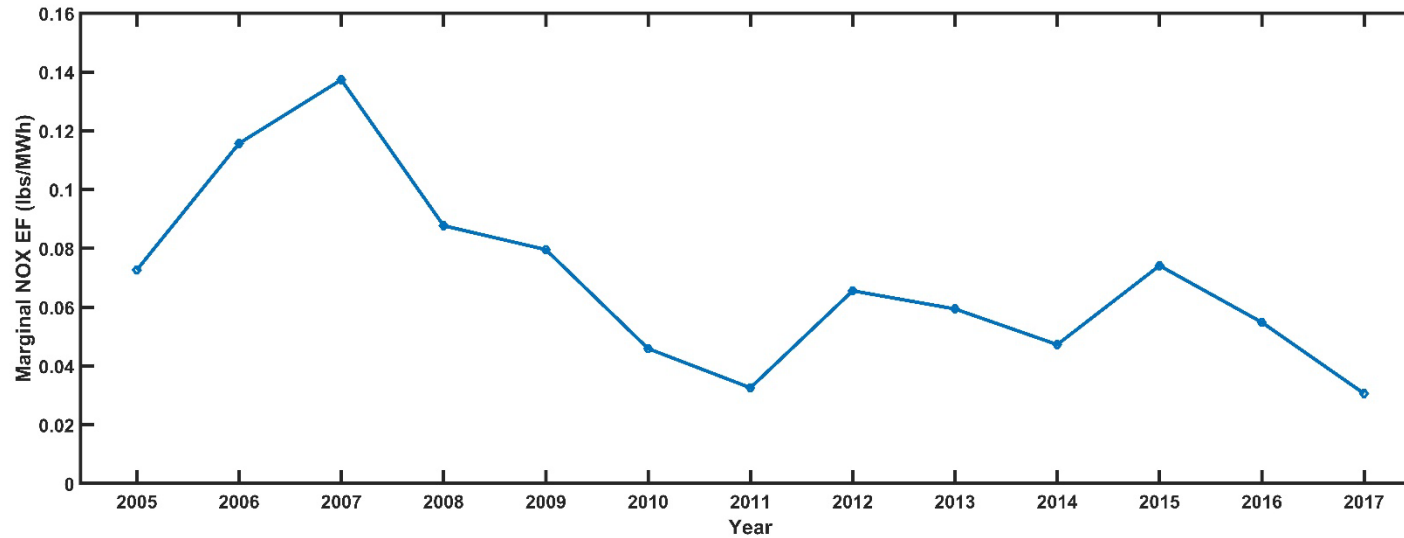
2012 CO₂ Marginal Emissions



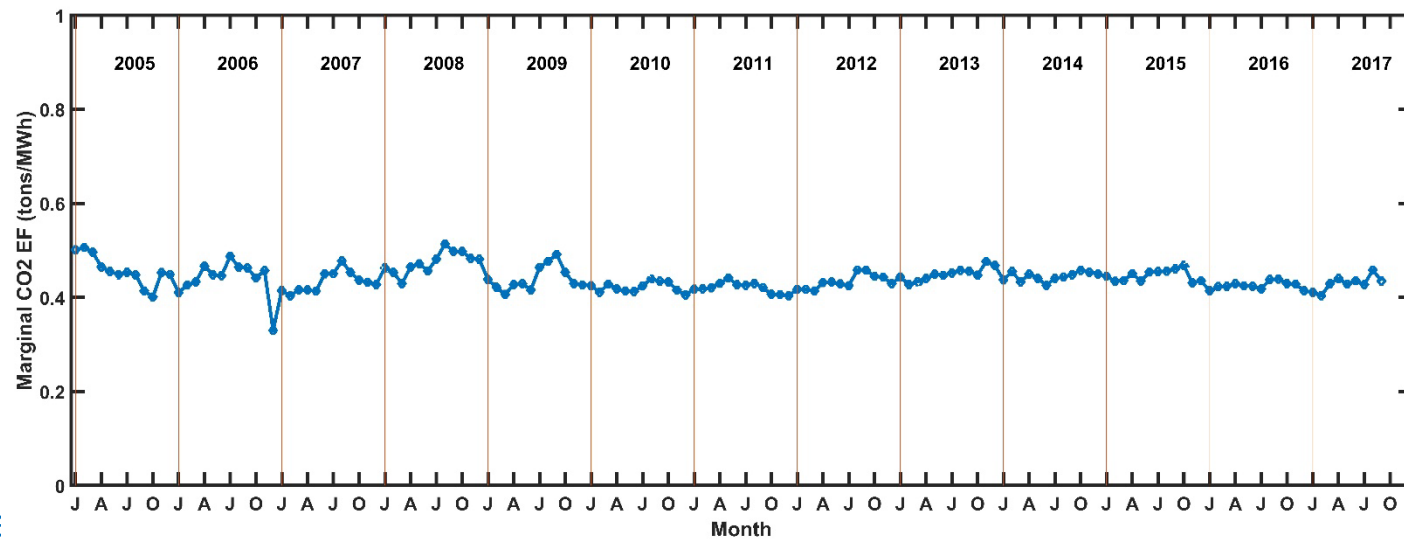
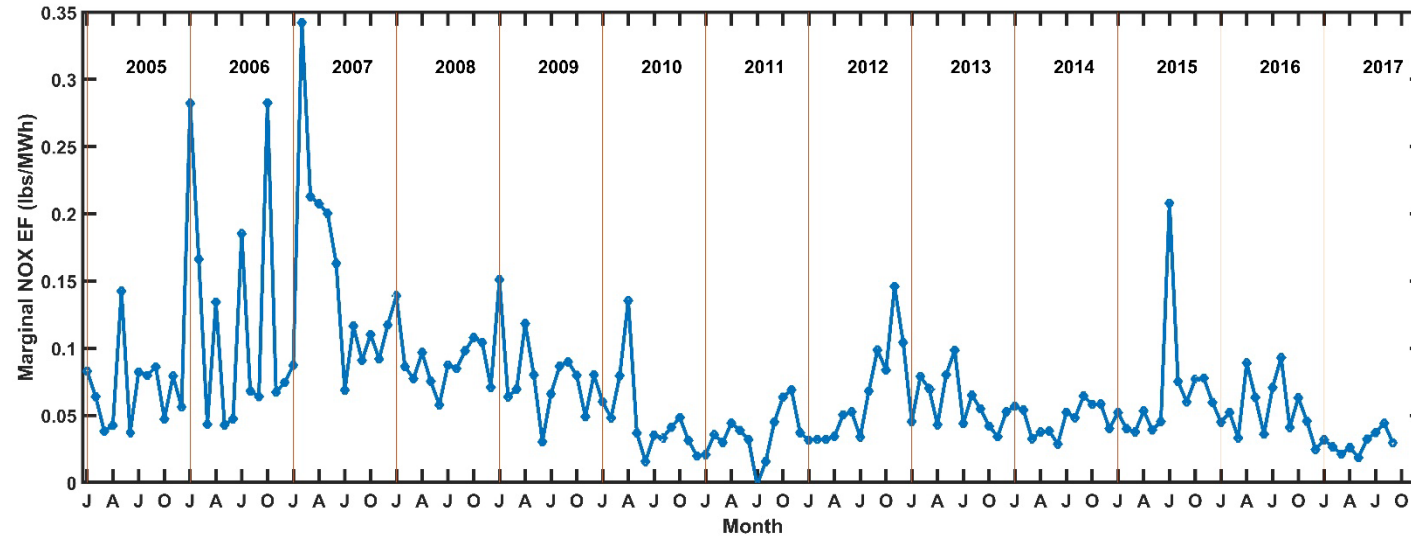
2012 NO_x Marginal Emissions



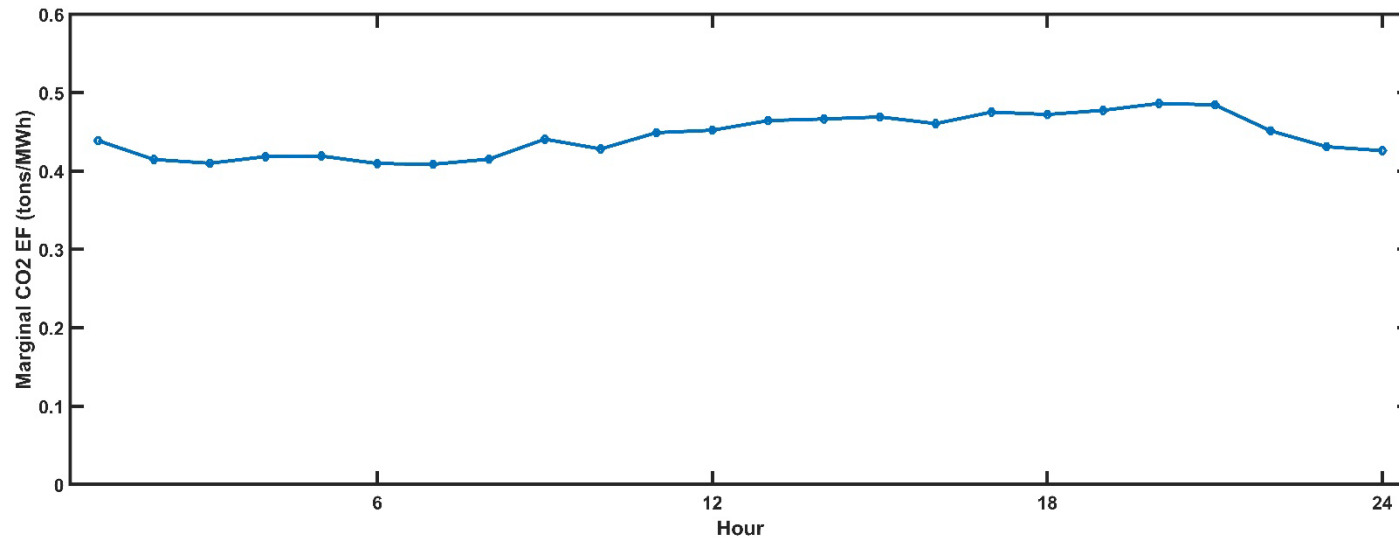
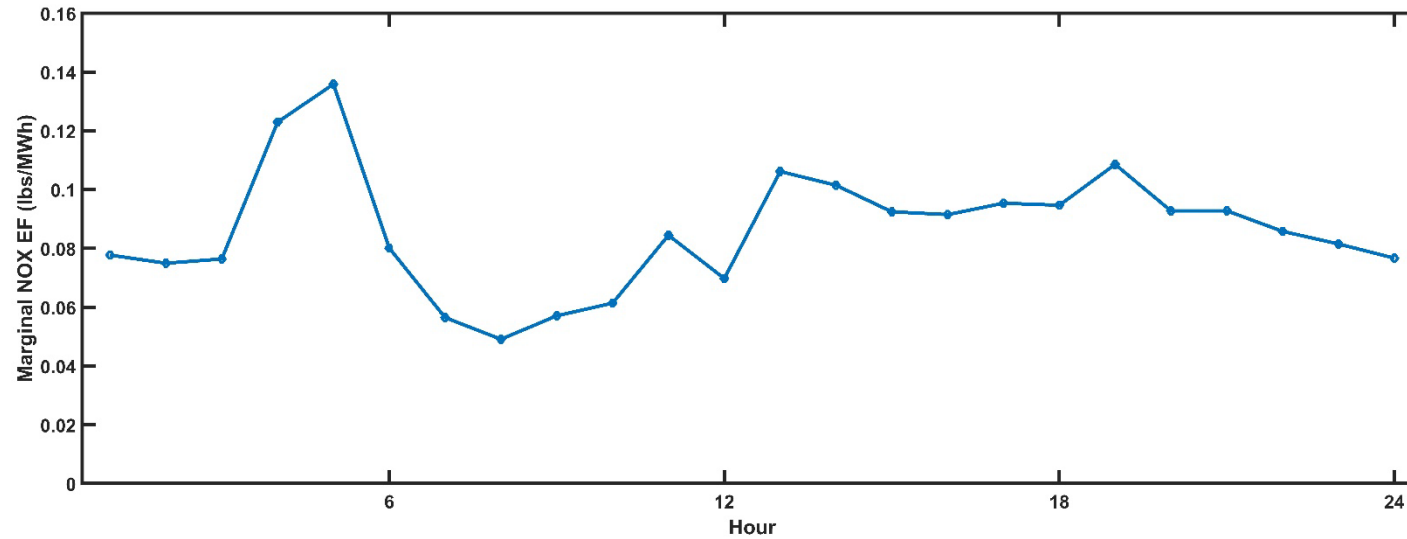
Year-by-Year Marginal Emission Factors



Month-by-Month Marginal Emission Factors



Hour-by-Hour Marginal Emission Factors



Public Comment



blog.cleanenergy.org

Next Steps

Residential NEAT	Not Yet Started	In Progress	Draft Complete	WG meeting #
Building of tool framework (GUI, file I/O)			X	2
Collection of input data			X	2
Demand segment of tool			X	2 and 3
Implementation of distributed solar			X	2
Implementation of distributed battery storage			X	Future
Electric Rate Calculator			X	3
Natural Gas Rate Calculator			X	Future
Implementation of net metering			X	3
Solar and battery cost calculator			X	Future
Electric generation emission factors		X		3
• Advanced EFs: Implementation of HiGRID	X			Future
Gas leak and electricity transportation loss		X		Future
Results analysis tools		X		Future

