DRAFT AGENDA
TOWN OF LYONS
UTILITIES AND ENGINEERING BOARD (UEB)

HYBRID MEETING
LYONS TOWN HALL, 432 5TH AVENUE, LYONS, COLORADO

October 4, 2023 4:30 - 6:00 pm

Join optional Zoom Meeting
https://us02web.zoom.us/j/88399705828?pwd=Q3RCemZvK1c4akpiamRaK2lIYWQ3QT09

Note that detailed content, if available, such as presentations is provided in subsequent pages.

I. Roll Call

II. Approve Agenda and Minutes from Past Meetings
   a. Approve Agenda
   b. Approve September 20, 2023 Minutes

III. Business
   a. Town of Lyons Energy & Capacity Costs, TOU & BESS Investigation Project - Rich Barone, Tierra Resources
   b. NREL Solar and Storage Project Review - Gerald Robinson, Lawrence Berkeley National Lab
   c. New Electric Demand Based Rate Structures for Class 3 EV Chargers and Possibly for Non-taxable Accounts

IV. Audience Business

V. Staff Report
   a. Staff – Aaron Caplan
   b. Board of Trustees Liaison – Greg Oetting
   c. UEB Chair – Jim Kerr
   d. Member Updates

VI. Summary of Action Items

VII. Next Meeting and Requested Agenda Items
   a. Arrange Jane's Hydrogen Storage tour - likely 18 Oct UEB meeting will become a tour workshop. This would result in the next regular meeting being 4 Nov, although this could get postponed until 6 Dec as Jim will be unavailable the month of November.

VIII. Adjournment

Persons needing accommodations or special assistance should contact the Town at hr@townoflyons.com as soon as possible, but no later than 72 hours before the scheduled meeting

DRAFT MINUTES
TOWN OF LYONS
UTILITIES AND ENGINEERING BOARD (UEB)
September 20, 2023, 4:30 - 6:00 pm
HYBRID MEETING

ROLL CALL

Jane Allo, Chris Cope, Lee Hall, Jim Kerr, Chris Meline, Gina Hardin
BoT: Gregg Oetting
Staff: Aaron Caplan
SFC Liaison: Edward Kean
Guests: Diane Dandeneau (local solar/battery expert)

APPROVE AGENDA AND MINUTES FROM PAST MEETINGS

- Approve Agenda and Minutes from Past Meetings
  - Approve Agenda
  - Approve September 6, 2023, Minutes
    - It was noted that the August 2, 2023 minutes were inadvertently provided with the draft agenda but that the correct minutes were emailed earlier to all the UEB members.
- **Minutes and Agenda approved unanimously.**

AUDIENCE BUSINESS

- No audience in attendance.

REPORTS

- **Aaron Caplan (Engineering, Building & Utilities Director)**
  - No meeting with NREL to discuss town-owned solar vs PPA. They will compare next week and then assist with RFD.
  - Tierra Consulting: Mostly complete. Presented to BoT on Sept 5. The video is available from the town website. The presentation can be found at 2 hrs 32 minutes.
    - Questions remain on Time of Use. Work will have to occur with Caselle billing software splitting up peak vs non-peak charges. Caselle and Sensus will need changes to support this.
    - Tierra's proposal is 8 cents for non-peak and 24 cents for peak. That's a 33% decrease in non-peak, but a 100% increase in peak.
    - UEB would like for Tierra to provide the presentation a week in advance of next meeting.

        - Next SFC meeting is Oct 12. We may coordinate a joint UEB/SFC presentation from Tierra.
        - We may have a workshop on Oct 4 at Jane Allo's company to look at hydrogen. Or we could review the Tierra report if it's ready.
  - Solar CoOp: 100 people are interested Boulder county wide. Unknown how many from Lyons. They are getting RFPs ready.
  - Nothing to report on wastewater plans and what's next.
  - The Town has no building fees on electric meters right now.
        - Aaron would like to add this to the fee schedule. $125 for standard 2S meter. $300-$400 for non-standard commercial.
  - The BoT wants the Time of Use switchover to occur after a long notice and education campaign.
  - Electric and water usage is lower than expected due to a mild summer. $100K lost revenue on electric alone.
        - This is needed to forecast next year's budget.

- **Gregg Oetting (BoT)**
  - Tierra presented to the BoT. Rich Barone overwhelmed them with detail.
  - BoT approved 2023 National Electric Code
  - WWTP planning underway.
  - Water shares: Leigh Williams of 317 Evans paid cash-in-lieu.
  - Gregg is pondering if we should buy more Lake McIntosh shares. He would like a UEB recommendation.
  - Aaron noted that if we get an opportunity to 3x LM shares for 1 CBT share, we should consider it.
  - Cope suggested that someone needs to model new Time of Use and Fixed Cost Recover Charges with different scenarios for EV penetration to see the impact on our rates. This will be useful to share with the public for why we are moving to Time of Use.
  - Edward suggested that we do the same with the penetration of electric appliances (heat pumps and stoves).

- **Jim Kerr (UEB Chairman)**
  - Thomas Maggio has resigned from the UEB so there is an open position.

- **Member Updates**
  - Nothing

BUSINESS

- Solar Farm and Battery Storage Project Discussion
  - Jim talked to a person from Premier Energy. They are selling solar farms and batteries to towns. Batteries are sized to 150 kW.
  - This person said that WAPA has a battery size limitation. We need to verify that because Jim had not heard of that.

- This person also thought we could get more a ITC discount if we owned rather than going for a PPA.

• Electric Demand
- Jim is looking at Time of Use rates.
- Class 3 EV chargers will need a special rate schedule. Demand-peak charges will incentivize use of batteries.
- Town of Lyons pays cost for their power. A peak demand charge may be required to ensure that the electric fund is not subsidizing their usage.

• Questions of DOLA/PPA.
- DOLA won't pay until the project is commissioned. Maybe they will reimburse for materials on site. The payment timeline is a challenge for the budget.

SUMMARY OF ACTION ITEMS

- Aaron to investigate yield and resiliency differences between LM and CBT shares (carried over).
- Aaron continue discussions with Chris LeMay at DOLA about PPA possibility (ongoing).

DECISIONS MADE

- Agenda and draft minutes from September 6, 2023, approved unanimously.

NEXT MEETING AND REQUESTED AGENDA ITEMS

- UEB workshop to tour Jane Allo hydrogen storage on either October 4 or 18th. We'd leave Lyons at 4:30.
- Tierra presentation on Oct 4 or 18 depending on when they are ready.

Meeting Adjorned at 5:41

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Town of Lyons Energy & Capacity Costs, TOU & BESS Investigation Project

Final UEB Presentation
October 4, 2023

Project Tasks & Objectives Recap

Task #1: Energy Costs & Savings Opportunities

- Identify and evaluate all cost components of Town of Lyons' electricity bills
- Establish Theoretical Maximum Savings Opportunities Via Load Shifting

Task #2: Time of Use (TOU) Rate Analysis

- Evaluate Multiple Time of Use Rates
- Identify best practices
- Develop Theoretical TOU Rate for Lyons
- Assess Savings Opportunism
- Identify Customer Impacts
- Perform Simply Payback Cost Effectiveness Evaluation

Task #3: Battery Energy Storage (BESS) Assessment

- Based on Task $1 Maximum Savings Opportunities, Get Cost Estimate for BESS System to Achieve Maximum Savings
- Evaluate Grants Potential and Financing Options
- Develop Pro Forms Incorporating All Costs and Potential Funding & Financing

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Project Findings: Task #1

Maximum Achievable Savings

- Based on an assumption that the key cost drivers in terms of system load can be spread out over the 24-hour day to result in the lowest possible cost drivers for both Fixed Cost Recovery Charge as well as Transmission charges – and assuming no additional kWh consumption, the maximum theoretical economic benefit that Lyons could receive is approximately.
- Given that the FCRC is calculated based on a 36-month rolling average, and the Transmission charges are calculated based on a 12-,omth rolling average, these maximum savings cannot be realized immediately, even if a combination of TOU Rates and a town Battery Energy Storage System (BESS) were installed tomorrow.
- This theoretical maximum savings is based on a targeted kW load shift; that load shift is derived from the maximum coincident and non-coincident historical peaks, which while not necessarily a frequent occurrence only need to occur once per month to establish the charges. Thus, the sizing of the shift (1.37MW) , and thus the sizing of a BESS, is pegged to the largest observed delta between the peak historical kW and the average kW for the corresponding month.

Project Findings: Task #2: Time of Use

Analysis

- Assuming a mandatory TOU Rate, Tierra modelled the realized savings over a 10-year horizon.
- Developed a savings curve that reflected the following rolling averages calculations for the primary charges:
  - Fizzed Cost Recover Charge: 36-month rolling average.
  - Transmission Charges: 12-month rolling average.
- To model the savings associated with each of the above charges, Tierra modelled a straight-line savings approach of the 36- and 12-month periods, respectively.

Finding

Simple payback can be achieved in less than 4 years

TOU Details

- **Off-peak Period:** Midnight to 3PM; 8PM to Midnight.
- **On-Peak Period**: 3PM – 8PM
- **Off-peak $/kWh**: $.08/kWh
- **On-peak $/kWh:** $.24/kWh

		Cumulative Savings									
	Launch	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Up-front Costs	$30,000										
Transmission Savings		$1,776	$5,311	$8,846	$12,381	$15,916	$19,451	$22,986	$26,521	$30,056	$33,591
FCRC Savings		$3,545	$10,634	$24,813	$35,447	$46,081	$56,715	$67,349	$77,983	$88,617	$99,251
Total	-$30,000	$5,321	$15,945	$33,659	$47,828	$61,997	$76,166	$90,335	$104,504	$118,673	$132,842

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Project Findings: Task #2: Time of Use

Key Assumptions

- **Impacts in Peak Demand:** Based on both publicly available and proprietary information, impact on Peak Load was modelled at 3% of System Peak
- **Baseline kW, kWh & Costs:** 2021 figures were used.
- **Adoption Rate:** Assumed that TOU was mandatory and thus 100% adoption.
- **Savings Realization:** For simplicity, Simple Payback assumes that customers continue to pay a comparable dollar amount over the TOU horizon so as to present a virtual payback; in reality, as consumption during peak periods goes down, the Town's overall bill exposure will also be reduced commensurately, as will customer bills for toes enjoying the savings benefit of TOU. Additional modeling could be employed to optimize the Om-peak & Off-peak Rates to co-optimize for customer benefit while minimizing a reduction in collections. .
- **Implementation Costs:** The following costs were input into the Simple Payback Analysis; additional investigation is required to refine the AMI and Billing System costs:
  - *AMI Modifications (TOU Rate into Meter Registers)* = $10K
  - *Billing System Updates (to accommodate TOU Rate)* = $12.5K
  - *TOU Marketing Costs* = $7.5K

Important Considertations

- **No Load Growth Assumed:** Despite a push towards electrification and an anticipated growth in Electric Vehicle charging, no load growth was assumed in developing this analysis.
- **"Winners & Losers":** Industry analysis reports that upwards of 40% of customers endure an increase in monthly electricity costs because of TOU Rates. This is largely due t the lack if smart devices that can be programmed to consume during Off-peak periods.
- **Devices/MEAN DR Potential:** It is worth noting that MEAN indicated that they have explored Demand Repose programs in the past with limited success. They also have limited budget. However, they did express an interest in any ideas that Lyons might have to offer. To this end, it may be worth exploring a common device option that can be programmed to transfer load to Off-peak periods. This may be a smart thermostat, leveraging pre-cooling during the summer, and pre-heating during the winter, or controllable hot water heaters as exam[les. MEAN may be willing to offer monies to support a rebate program, where customers can get a rebate if they purchase and install a smart device.

Project Findings: Task #3

Battery Energy Storage System (BESS) Costs: Based on a 1.37MW BESS

Product	Product Family	System	UOM	Sales Price	Quantity	Total Price
5.4.6.A-652.8-2611.2 - Hardware	Hardware	Oracle-One Off-CO	Upfront	$1,303,304	$2	$2,606,608
Tesla Site Master Controller	Hardware	Oracle-One Off-CO	Upfront	$6,727	$1	$6,727
Megapack - Base Per Site Commissioning Fee	OEM Services	Oracle-One Off-CO	Upfront	$13,454	$1	$13,454
Megapack - Per Pack Commissioning Fee	OEM Services	Oracle-One Off-CO	Upfront	$3,363	$2	$6,727
Megapack 2 XL - 10 Year Base Per Site Preventive Maintenance Fee	OEM Services	Oracle-One Off-CO	Upfront	$47,029	$1	$47,029
Megapack 2 XL - 10 Year Per Pack Preventive Maintenance Plan Fee	OEM Services	Oracle-One Off-CO	Upfront	$64,664	$2	$129,327
Tesla - 10 Year Warranty	OEM Services	Oracle-One Off-CO	Upfront	$0	$1	$0
Shipping	Hardware	Oracle-One Off-CO	Upfront	$24,800	$1	$24,800
Athena Base BTM	Software	Oracle-One Off-CO	Upfront	$62,498	$1	$62,498
Base Utility Bill Optimization	Software	Oracle-One Off-CO	Upfront	$68,747	$1	$68,747
Core ROC Services	Professional Service	Oracle-One Off-CO	Upfront	$62,498	$1	$62,498
Program Revenue Services - Recurring - UBO	Professional Service	Oracle-One Off-CO	Upfront	$31,249	$1	$31,249
Provisioning and Commissioning - BTM	Professional Service	Oracle-One Off-CO	Upfront	$18,000	$1	$18,000
Program Revenue Services - Activation - UBO	Professional Service	Oracle-One Off-CO	Upfront	$5,000	$1	$5,000
Estimated Install cost	$400/kW					$522,240
Estimated Tax	7%					$184,346
Total						$3,789,250

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Project Findings: Task #3

Grants, Tax Credit & Financing Possibilities

Microgrids for Community Resilience Program

- Planning Grants
  - 25% march
  - Maximum award = $36K
- Implementation Grants
  - 33% march
  - Maximum award = $1,005,000
- Community-based anchor institutions

ITC for Standalone Energy Storage

- Base ITC rate for energy storage projects is 6%
- Projects beginning construction prior to Jan. 1, 2025, are eligible for the ITC

Financing

- Green Bank of Colorado
  - Green Bonds provide access to capital at 2-4% interest, with 20-25-year term (up to $500 million USD)
  - Provides financing for sustainable community-impact projects.

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Project Findings: Task #3

BESS Simplified Pro Forma

	2024	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2036	2038	2039
Project Costs	$3,800,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Financing	$0	$330,000	$330,000	$330,000	$330,000	$330,000	$330,000	$330,000	$330,000	$330,000	$330,000	$0	$0	$0	$0
Total Costs	$3,800,000	$330,000	$330,000	$330,000	$330,000	$330,000	$330,000	$330,000	$330,000	$330,000	$330,000	$0	$0	$0	$0
Grant	$1,000,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ITC	$0	$228,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Loan	$2,800,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Savings	$0	$56,000	$113,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000
Total Benefits	$3,800,000	$284,000	$113,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000
Annual Net	$0	-$46,000	-$217,000	-$180,000	-$180,000	-$180,000	-$180,000	-$180,000	-$180,000	-$180,000	-$180,000	$150,000	$150,000	$150,000	$150,000
Cumulative	$0	-$46,000	-$263,000	-$443,000	-$623,000	-$803,000	-$983,000	-$1,163,000	-$1,343,000	-$1,523,000	-$1,703,000	-$1,553,000	-$1,403,000	-$1,253,000	-$1,103,000

Assumptions

- $1M Implementation Grant
- 4% Green Bond Financing
- BESS Project Cost: $3.8M
- One-time 6% ITC
- Maximum Theoretical Savings:
  - Builds to$150K

Conclusions

- Even with “Best Case” grants and financing, payback period exceeds the useful life of the BESS
- IRA may introduce additional $, which may increase grant opportunities
- Even if ITC could be applied at same level as solar projects (30%), project is still does not achieve break-even

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Appendix

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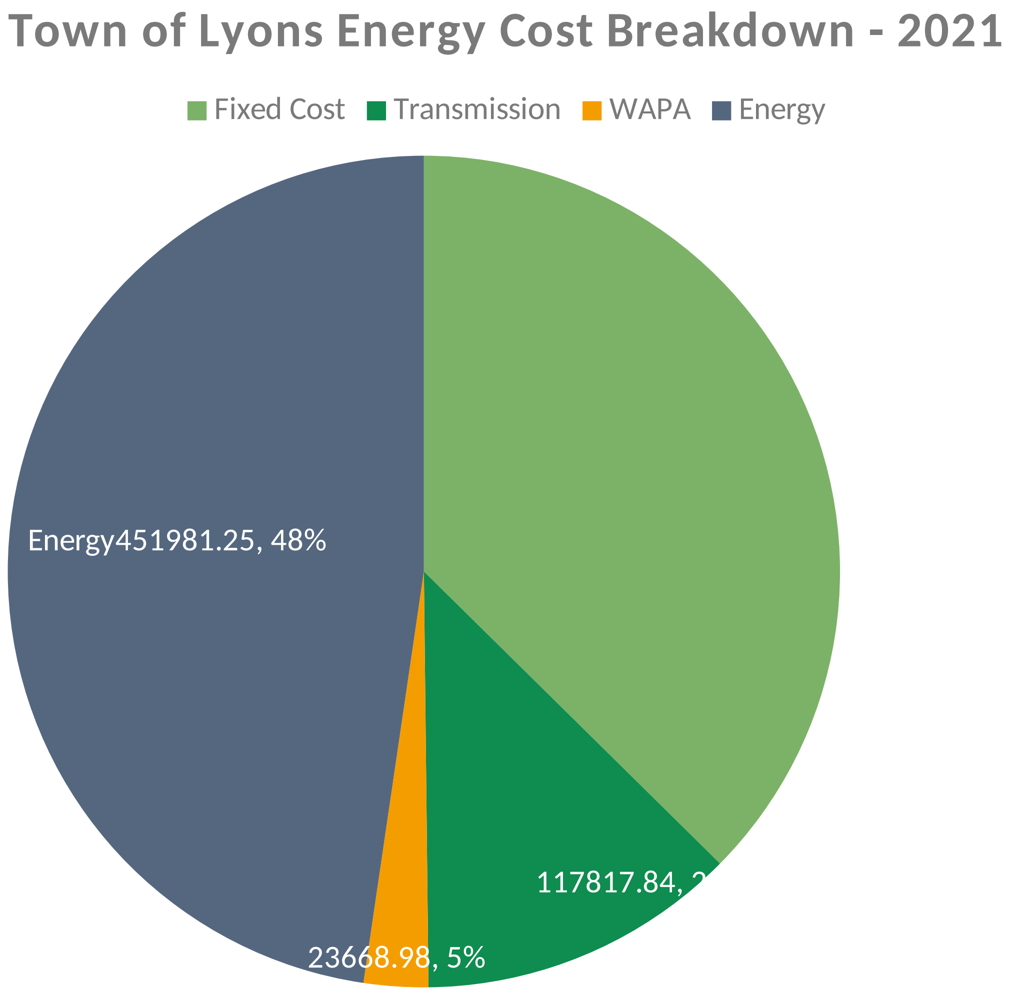
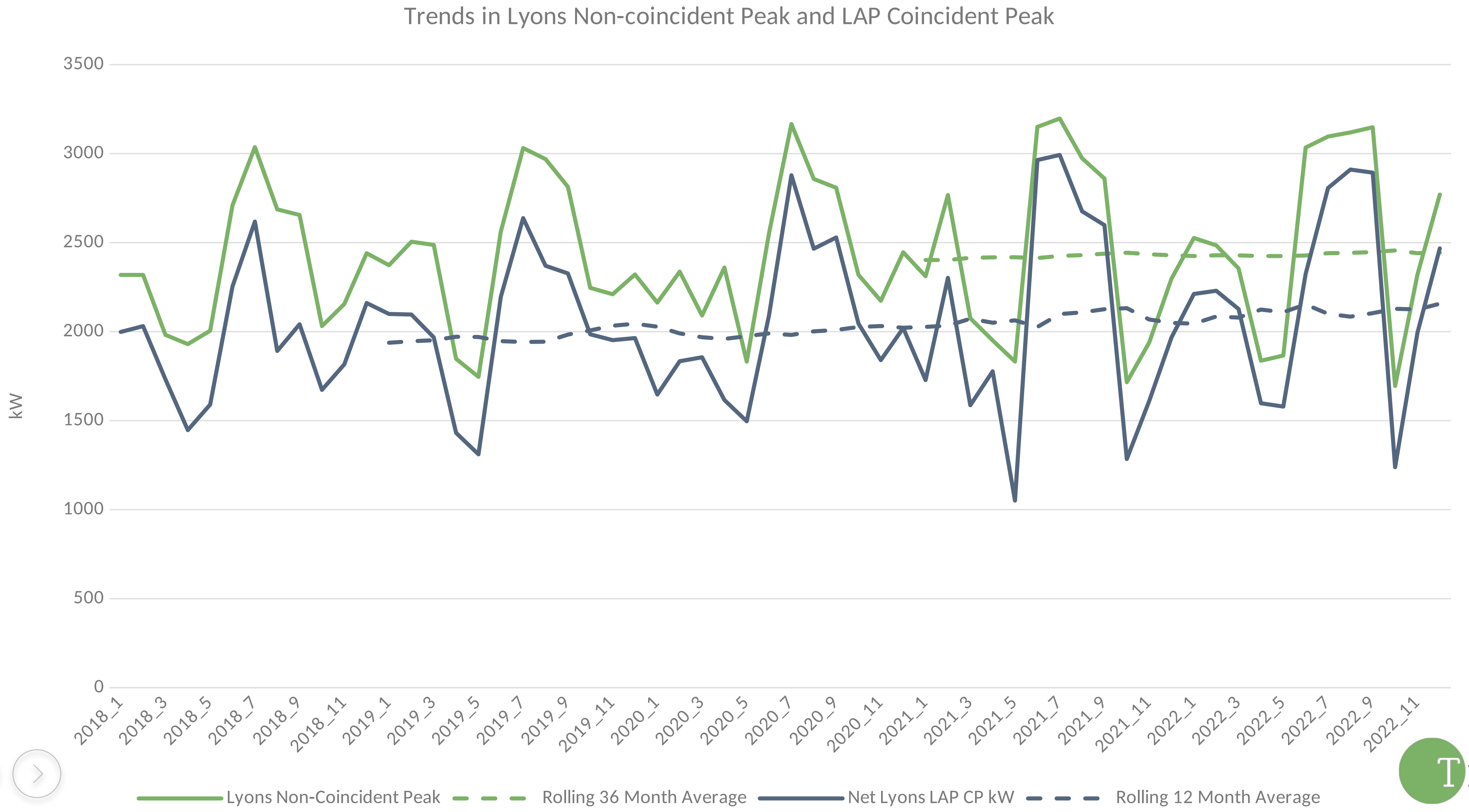
Demand and Economic Modelling



Demand and Economic Modelling



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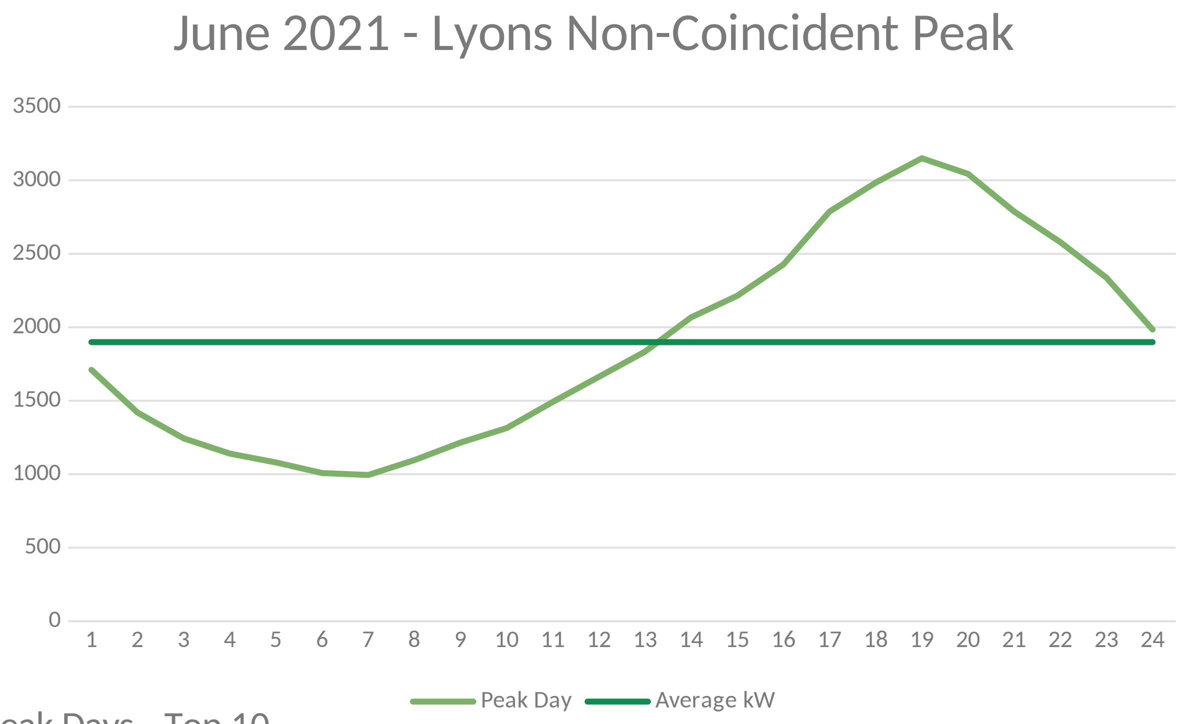
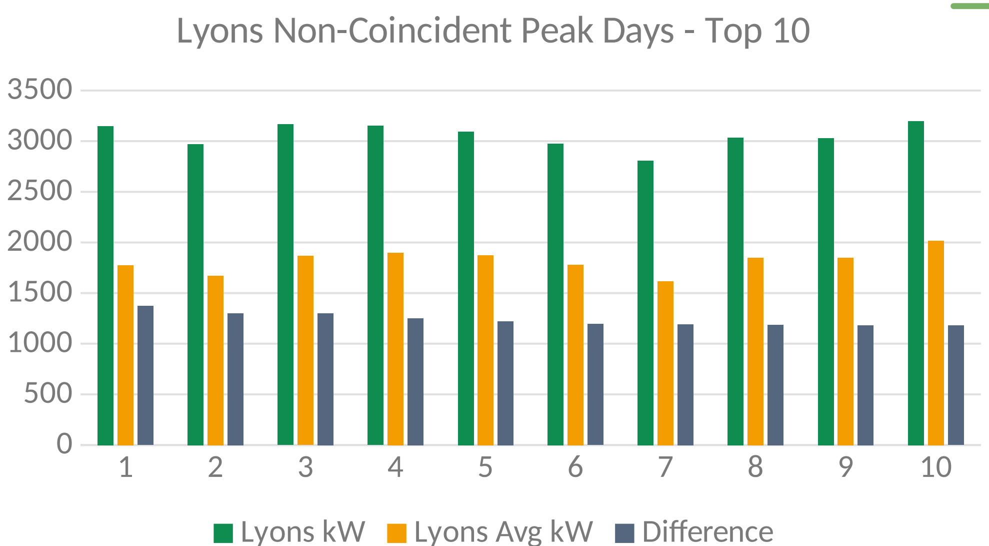
Demand and Economic Modelling

Rank by Peak	Lyons kW	Lyons Avg kW	Difference	Year	Month	Hour Ending
1	3197	2018	1179	2021	7	(4-5pm) 17
2	3166	1867	1299	2020	7	(6-7pm) 19
3	3150	1899	1251	2021	6	(5-6pm) 18
4	3148	1776	1372	2022	9	(5-6pm) 18
5	3119	1983	1136	2022	8	(5-6pm) 18
6	3096	1873	1223	2022	7	(6-7pm) 19
7	3036	1913	1124	2018	7	(5-6pm) 18
8	3034	1848	1186	2022	6	(5-6pm) 18
9	3031	1851	1180	2019	7	(5-6pm) 18
10	2974	1779	1195	2021	8	(5-6pm) 18





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Time of Use

- Evaluated TOU Rates from the following utilities:
  - Xcel
  - Southern California Edison
  - Pacific Gas & Electric
  - Arizona Public Service
  - Salt River Project

Literature Review

- Wide range of effectiveness
  - Ranging from 50% peak demand reduction to 1^ demand reduction
- Multiple variables, including:
  - Opt-in vs. Mandatory vs. Opt-out
  - Technical enablement
  - Customer education
  - Price Spread
- Only 10% - 15% of customers showing bill savings
  - According to recent University of Texas Study
- Potential for creating new "peaks"
  - May not be most carbon-beneficial

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Arizona Public Service (APS)

Plan Description

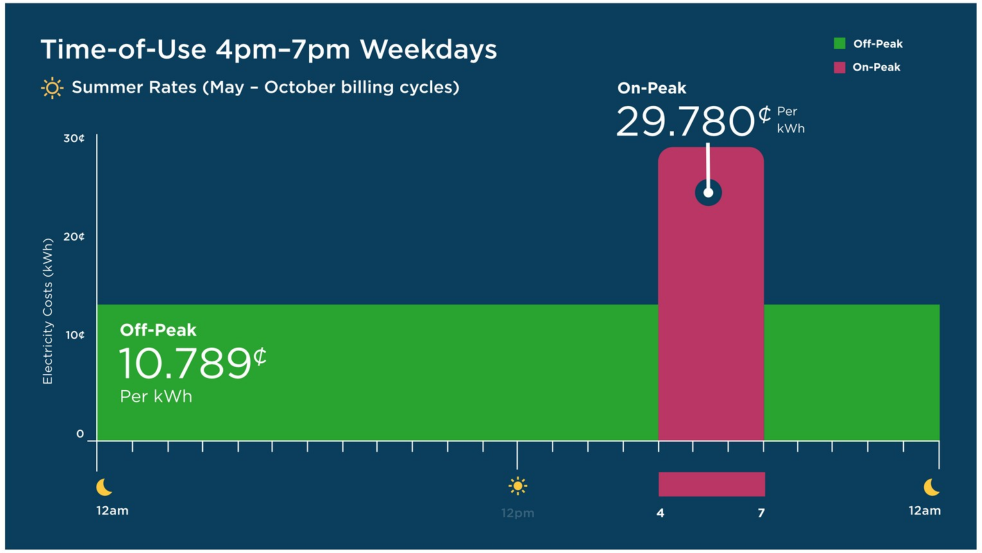
APS offers a Time-of-Use plan that has consistent hours (4pm to 7pm) throughout the year but with higher summer rates (May through Sept). The plan also includes a winter super off-peak rate from 10am to 3 pm weekdays.

Key Messages

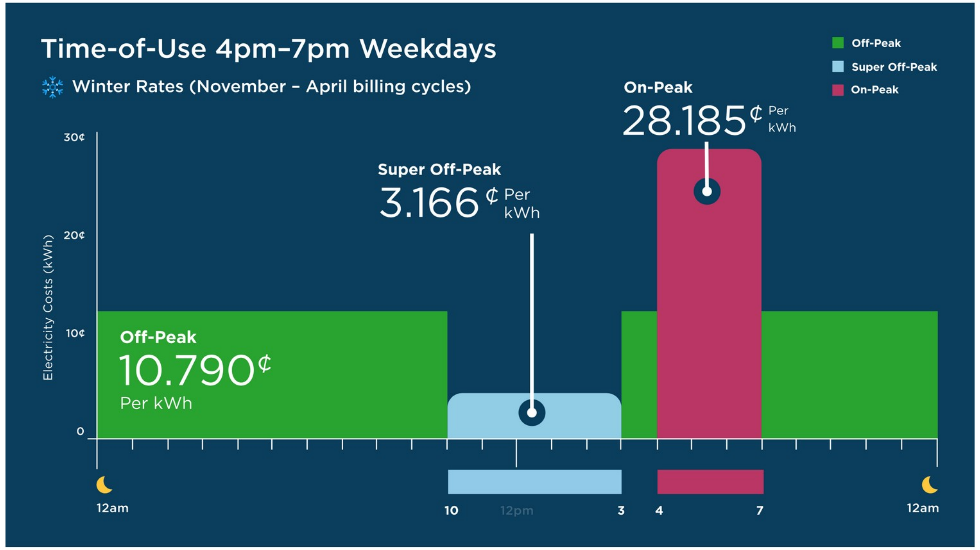
APS positions rate plans, including TOU, as a customer option or choice similar to how they position customer billing and payment programs. They tie the choice to fit with customer lifestyle and needs.

APS communications also focus heavily on savings potential, positioning rate plans as a way to save money. They include messaging about the customer making sure that he/she is on the rate plan that offers the greatest savings and focus on shifting appliance use to off-peak times in their content and graphics.

Summer Rates



Winter Rates



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Salt River Project (SRP)

Plan Description

SRP offers two TOU rate plan options, which they refer to as Time-of-Day price plans. The first has a 6-hour on-peak window in summer (2pm to 8pm) and offers greater savings potential. The second TOU rate, EZ-3, has a compressed summer on-peak period and offers two time options - 3pm-6pm or 4pm-7pm . All plans have higher summer peak rates for July and August and summer rates for May, June, September, and October. The standard TOU plan has winter on-peak periods of 5am-9am and 5pm-9pm.

Key Messages

SRP positions the rate plans around customer choice and providing options to meet both budgetary and lifestyle needs. They indicate that the plans reward customers with price breaks if they are able to shift energy use outside of the windows when there is the greatest demand on the power grid. They also focus on pre-cooling to save energy in both in web content and a video on their website.

In addition, they offer a risk free 90-day trial period in which they will provide a credit to the customer if they would have saved on their standard rate plan to allay any customer concerns about bill impacts of switching to a TOU rate plan.

	EZ-3	TOU
Winter rates Nov. through April prices per kWh	On-peak **11.57¢**	On-peak **10.45¢**
	Off-peak **8.32¢**	Off-peak **7.85¢**
Summer rates May/June/Sept./Oct. prices per kWh	On-peak **29.71¢**	On-peak **21.70¢**
	Off-peak **9.05¢**	Off-peak **8.03¢**
Summer peak rates July through August prices per kWh	On-peak **35.20¢**	On-peak **24.85¢**
	Off-peak **9.29¢**	Off-peak **8.06¢**

Southern California Edison (SCE)

Plan Description

SCE offers two TOU rate plans. One that has on-peak hours of 4-9pm and one that has on-peak hours of 5-8pm. Both plans offer a baseline credit to offset differing energy needs and cost across their service territory that is calculated based on geography and by season. (A third TOU rate, TOU-D- Prime is available to high usage households, such as those with EV's or residential batteries.)

Key Messages

They position the plans around meeting differing needs based on lifestyle and geography – stay up late, coastal, early-risers, home during the day. They focus on the clean energy benefits of using off-peak wind and solar energy. They also focus on the savings benefits of 1) being on the right rate plan, shifting usage to off-peak and lowering usage.

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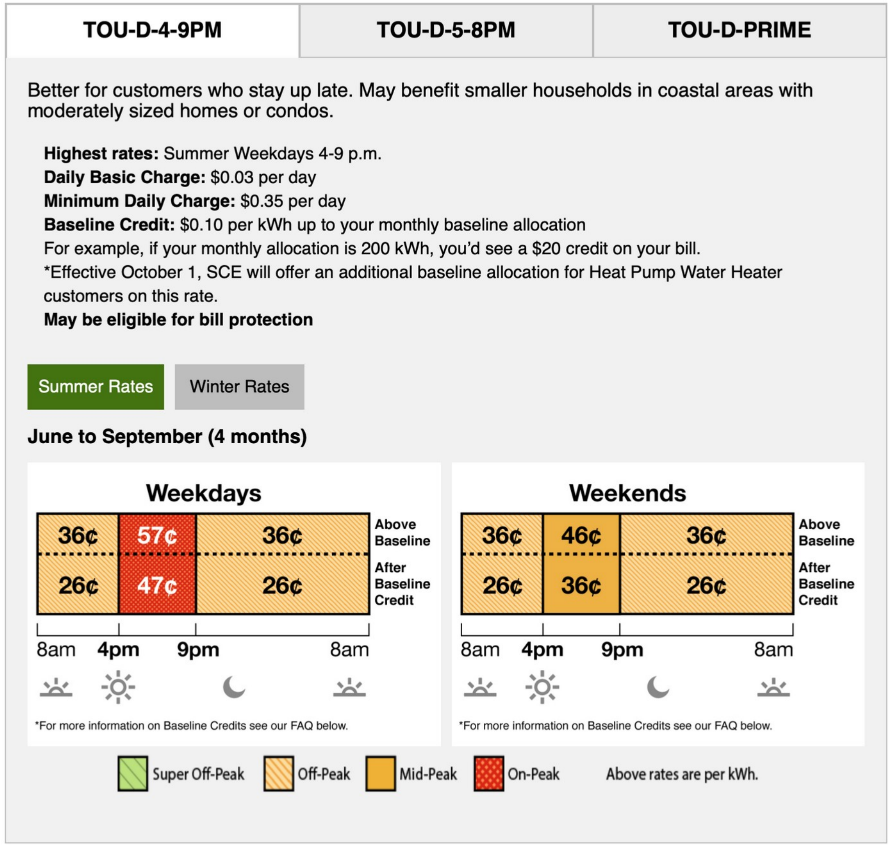
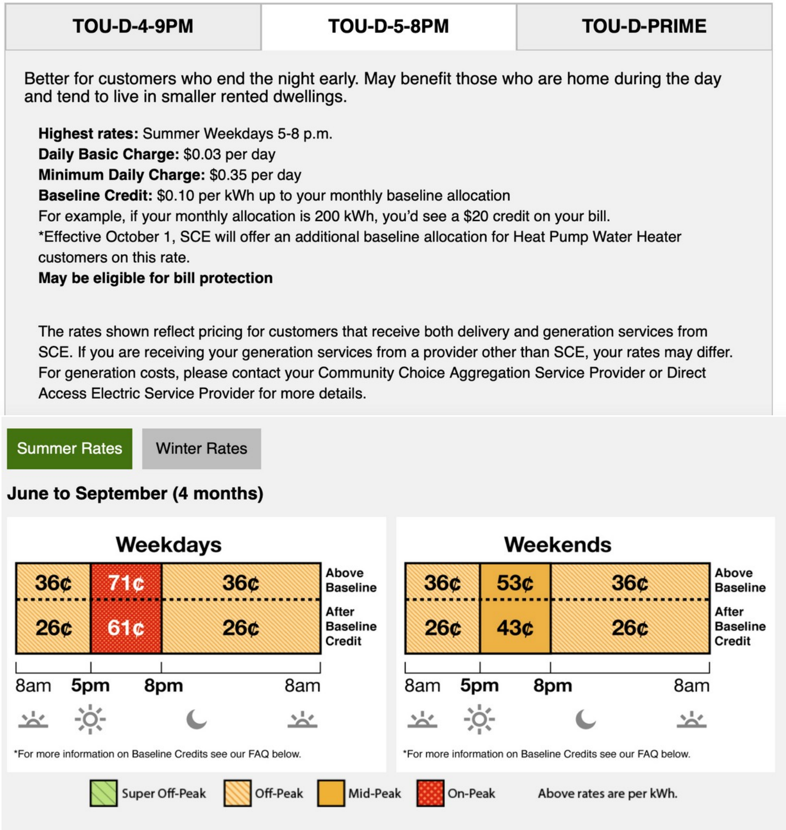

TOU-D-4-9PM | TOU-D-5-8PM | TOU-D-PRIME

Better for customers who stay up late. May benefit smaller households in coastal areas with moderately sized homes or condos.

Highest rates: Summer Weekdays 4-9 p.m.
Daily Basic Charge: $0.03 per day
Minimum Daily Charge: $0.35 per day
Baseline Credit: $0.10 per kWh up to your monthly baseline allocation
For example, if your monthly allocation is 200 kWh, you'd see a $20 credit on your bill.
*Effective October 1, SCE will offer an additional baseline allocation for Heat Pump Water Heater customers on this rate.
May be eligible for bill protection

Summer Rates | Winter Rates

June to September (4 months)


TOU-D-4-9PM | TOU-D-5-8PM | TOU-D-PRIME

Better for customers who end the night early. May benefit those who are home during the day and tend to live in smaller rented dwellings.

Highest rates: Summer Weekdays 5-8 p.m.
Daily Basic Charge: $0.03 per day
Minimum Daily Charge: $0.35 per day
Baseline Credit: $0.10 per kWh up to your monthly baseline allocation
For example, if your monthly allocation is 200 kWh, you'd see a $20 credit on your bill.
*Effective October 1, SCE will offer an additional baseline allocation for Heat Pump Water Heater customers on this rate.
May be eligible for bill protection

The rates shown reflect pricing for customers that receive both delivery and generation services from SCE. If you are receiving your generation services from a provider other than SCE, your rates may differ. For generation costs, please contact your Community Choice Aggregation Service Provider or Direct Access Electric Service Provider for more details.

Summer Rates | Winter Rates

June to September (4 months)

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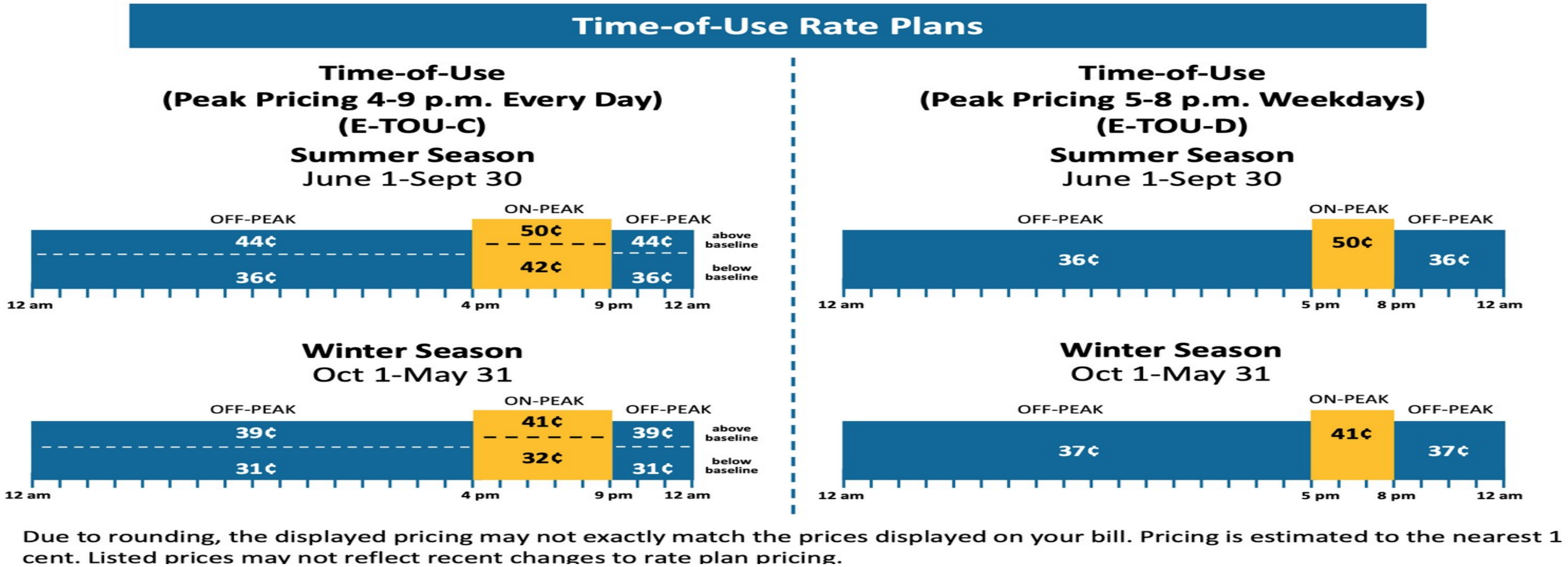
Pacific. Gas & Electric (PG&E)

Plan Description

PG&E offers two time-of- use plans – one from 4pm to 9pm and one from 5pm to 8pm. The TOU-C rate also includes different rates for a baseline amount of energy usage vs. energy above the baseline, which is calculated based on geography, season and heating source.

Key Messages

PG&E messaging focuses on when you use energy being as as important as how much you use, and on simple options to reduce use – load first, run later for the dishwasher and washing machine, and Using the t-stat to cool during off-peak. They also position the plans as a way to help California make progress toward clean energy goals, a smarter energy future and a healthier environment. They indicate that prices are lower during the majority of day (off-peak hours) because that's when renewable resources like solar is plentiful and demand is lowest.



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Xcel Energy (CO)

Plan Description

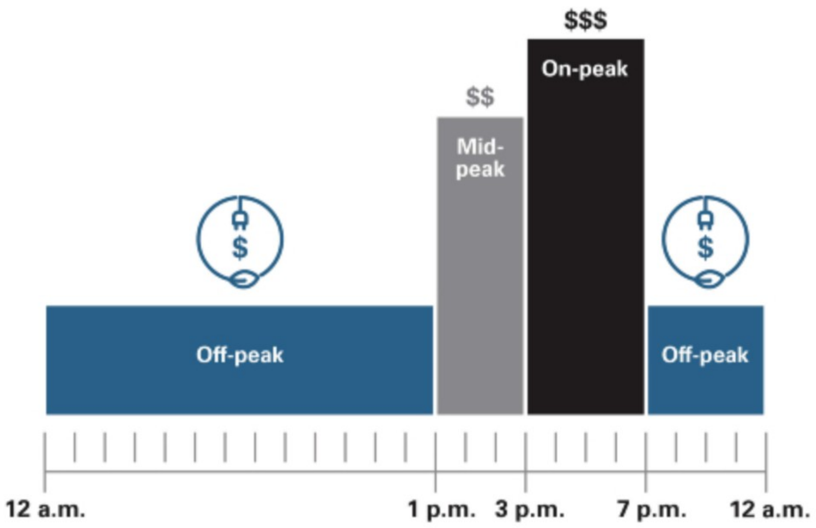
The Xcel Colorado TOU rate includes three time periods: on-, off- and mid-peak. The time periods are the same throughout the year, but pricing varies based on season.

Key Messages

Xcel's current messaging focuses on their introducing new TOU rates, and it being a new way to save. Because of the newness, their content focuses on the basic construct and savings tips – content such as energy cost being driven by how much and when you use and the three different time periods. In addition, they focus on ways to monitor usage - view bill for mid-, on- and off-peak usage, MyAccount – monthly daily, hourly and in 15- and 30-minute intervals.

Xcel ties the off-peak pricing to lower demand and the abundance of wind generation.

They provide a wide variety of savings tips, including ones for year-round and summer, for renters and at an appliance level.



Summer: June 1 – September 30 **Winter:** October 1 – May 30

Weekends and holidays billed at the off-peak rate.

Summer Prices

- Off-peak: 11 cents per kWh
- Mid-peak: 20 cents per kWh
- On-peak: 28 cents per kWh

Winter Prices

- Off-peak: 11 cents per kWh
- Mid-peak: 15 cents per kWh
- On-peak: 18 cents per kWh

TO: Aaron Caplan, Town of Lyons (TOL), Engineering, Buildings & Utilities Director
FROM: Gerald Robinson, Energy Technology Researcher - LBNL
RE: Solar PV + Storage Effort – Town of Lyons – Recommendations

After analyzing the factors of cost, tax incentives energy savings and the DOLA grant, it appears that some combination of solar and storage systems sizes would be financially viable should the Town of Lyons (TOL) engage a power purchase agreement (PPA) contract for the reasons listed below.

- Use of a PPA enables a private sector owner to claim the investment tax credit (TIC), the modified accelerated cost recovery system (MACRS), and tax deductions on operating expenses to deliver a cost of energy (kWh) and battery power (kW) lower than that which could be achieved with TOL direct ownership.

Factor	**Government owned**	**Private ownership**
1) Investment Tax Credit (ITC)	Yes - Transferred	Yes
2) 5-Year Modified Accelerated Cost Recovery System (MACRS) Depreciation	No	Yes & equal to federal + state corporate tax rate
3) O&M, insurance + other ownership costs	Not a tax deductible expense	Yes – operational expenses are tax deductible

- While TOL cost of energy ($/kWh) and demand ($/kW) is low under the MEAN contract, applying the DOLA $1M grant would more than cover the installation costs of the solar PV portion. This would allow some size of battery storage to be added as discussed below.
- Use of a PPA is a very important tool for public sector entities that are not staffed to maintain solar PV and storage assets, undertake power metering and manage product warranties, insurance claims and performance risks.

Solar and storage sizes

The NREL tools, ReOpt and the System Advisor Model (SAM) was used to look at an optimal battery size to go with the proposed 365 kW solar PV system. Conclusions from these modeling tools are:

- The DOLA $1M grant covers the installation costs of the 365 kW system assuming $3.00/Watt-DC.

- Due to the cost and structure of the MEAN contract, a storage battery by itself would not be cost effective, however, when the financial benefit of the solar system, DOLA grant, ITC and MACRS be considered, some size of storage battery would be cost effective.
- The optimal battery size to associate with the 365 kW-DC solar PV is a question of affordability which should be answered through the request for proposal process.
- The pending time of use (TOU) rate should be considered in the future battery size and included in the request for proposals (RFP).
- It is recommended to seek a battery size that maintains some savings to TOL and that can be recharged through the solar PV system.
    - TOL should pick a metric of savings to use in guiding decision making; simple annual savings or net present value (NPV) over a given analysis period.

Recommendation actions

1. Confirm with DOLA administrators that the grant funds can be used as a lump sum payment to buy down the PPA contract.
    a. Confirm any DOLA requirements around eventual TOL ownership by the end of the PPA contract term.
    b. Confirm any additional grant requirements that could influence the structure of a PPA contract.
2. Clearly state the TOL energy (kWh) and demand (kW) costs and savings (based on the MEAN contract terms) to bidders.
    a. Develop a “price-to-beat” that incorporates the kWh and kW savings potential from solar and storage system expressed in terms of $/kWh and $/kW demand for the battery system.
3. Issue an RFP for a 365 kW-DC ground mounted solar PV system and seek a battery size that allows the $/kWh and $/kW to be less than the price “price-to-beat”.
4. Incorporate basic solar technical requirements to cover safety, system longevity, site weather conditions; hail, wind or flooding concerns.
5. Issue an RFP and hold an industry day to provide important details on the MEAN contract structures that covers energy costs and the demand element of fixed cost recovery charges. Bidders are likely to need technical support from TOL to understand the MEAN contract costs and savings potential.

Recommended next steps

1. Develop an RFP for the PPA contract starting with a version used by the City of Craig or other DOLA grant recipient that has engaged in a PPA contract.
2. The DOE labs can provide comment on this RFP, help evaluate bidders and if awarded, comment on draft contract language and verify design drawings against basic technical and performance requirements.

by Jim Kerr
UEB Meeting Agenda Wednesday October 4, 2023
Agenda Item III c. New Electric Demand Based Rate Structures for Class 3 EV Chargers and Possibly for Non-taxable Accounts

1) Transmission Costs

Transmission costs are passed through on MEAN bills from WAPA. They are calculated by MEAN with inputs from WAPA every month using the previous 12 month coincident monthly hourly peak on the transmission line. The distributed generation policy does not affect these costs, but WAPA has its own distributed generation policy that requires the addition of behind the meter generation (such as rooftop solar) once the total amount exceeds 150 kWs. A MEAN analysis estimated that $4.57 per kW.

2) Fixed Cost of Recovery Charge

The FCRC costs are calculated by MEAN and are based on the monthly non coincident peak demand for 36 months. Revised costs are effective annually on 1 April and based on the previous 36 months ending the preceding September. Solar name plate kW is to be used in the FCRC calculations of all non grandfathered solar installations starting December 2019 if actual solar generation is not provided during the peak hourly demand for the month. Note that Lyons non coincident peak has historically always been late afternoon or evening so it is expected this cost.

3) Peak Demand Calculations - see following page

Peak Demand Calculations		
	CY 2021	Percentages
Revenue from 2021 Income Statement		
Residential electric sales	$1,085,132	69%
Non-residential electric sales	$330,225	21%
Non-taxable electric sales	$148,880	10%
Total Electric Sale	$1,564,236	100%
Total residential and non-residential sales through markups and base fees	$1,415,356	90%
Estimated Revenue from Base Fees		
Sales from non-taxable electric sales base fees	$0	
Sales from non-residential base fees 134 accounts	$28,944	17%
Sales from residential base fees 916 accounts	$142,896	83%
Total Base Fees	$171,840	100%
Total residential and non-residential sales through markups	$1,243,516	
Total residential and non-residential sales through markups and base fees	$1,415,356	
Costs from MEAN Bill		
Fixed Cost of Recovery Charge (FCRC)	$346,577	36.9%
WAPA Transmission	$117,818	12.5%
WAPA Hydro	$23,669	2.5%
Wind Allocation	$18,748	2.0%
MEAN Base Energy	$433,233	46.1%
Total Energy (Hydro, Wind, Base Energy)	$475,650	50.6%
Total MEAN Bill	$940,045	100.0%
Non-taxable sales from above at MEAN cost	$148,880	
Total minus Non-taxable/non-markup sales done at cost	$791,165	
Overall Markup required on Residential and Non-residential Energy	**1.79**	
FCRC		
Average 36 month Non-coincident peak used to calculate FCRC (Oct 18 - Sep 21). Note subtracts out WAPA energy and includes production solar	2,257	
Annual FCRC (Apr 22 - Mar 23)	$346,577	
Annual FCRC per Average Monthly Peak	$154	
Average Monthly FCRC (Apr 22 - Mar 23)	$28,881	
Average Monthly FCRC per Average Monthly Peak kW	$12.80	
Overall FCRC Demand Charge per Monthly Peak kW	**$22.89**	
WAPA Transmission		
Average 12 month non-coincident peak use as a substitute for co-incident peak (Jan 21 - Dec 21). Note includes MEAN and WAPA energy and not production solar - 2,535 kWs	2,535	
Annual WAPA transmission cost for 2021	$117,818	
Annual WAPA transmission cost per kW - $46	$46	
Average monthly WAPA transmission cost for 2021	$9,818	
Average monthly WAPA transmission cost per kW	$3.87	
Overall Monthly Retail Transmission Demand Charge	**$6.93**	
MEAN Green Rate per kWh (2023)	$0.04274	
Retail Rate per kW	**$0.07646**	
Current Lyons Residential Rate per kW	**$0.1275**	
Current Lyons Demand Rate	**$0.0000**	
Assume Base Fees should reduce demand charges		
Percent Demand from FCRC		74.6%
Percent Demand from Transmission		25.4%
Total = kWh * overall kW rate + (trans peak * overall trans demand rate – trans base fees) + (FCRC peak + overall FCRC demand rate – FCRC base fees) + Town costs		
Monthly Retail Trans demand rate = (transmission peak * overall trans demand rate – trans base fees)/Trans Peak	**$5.50**	
Monthly Retail FCRC demand rate = (FCRC peak * overall transmission demand rate – FCRC base fees)/FCRC Peak	**$21.28**	