



POWERING YOUR COMMUNITY SINCE 1898

# **Time of Use Rate Pilot Program Results & Recommendations**

**Presented to the Municipal Light Board**

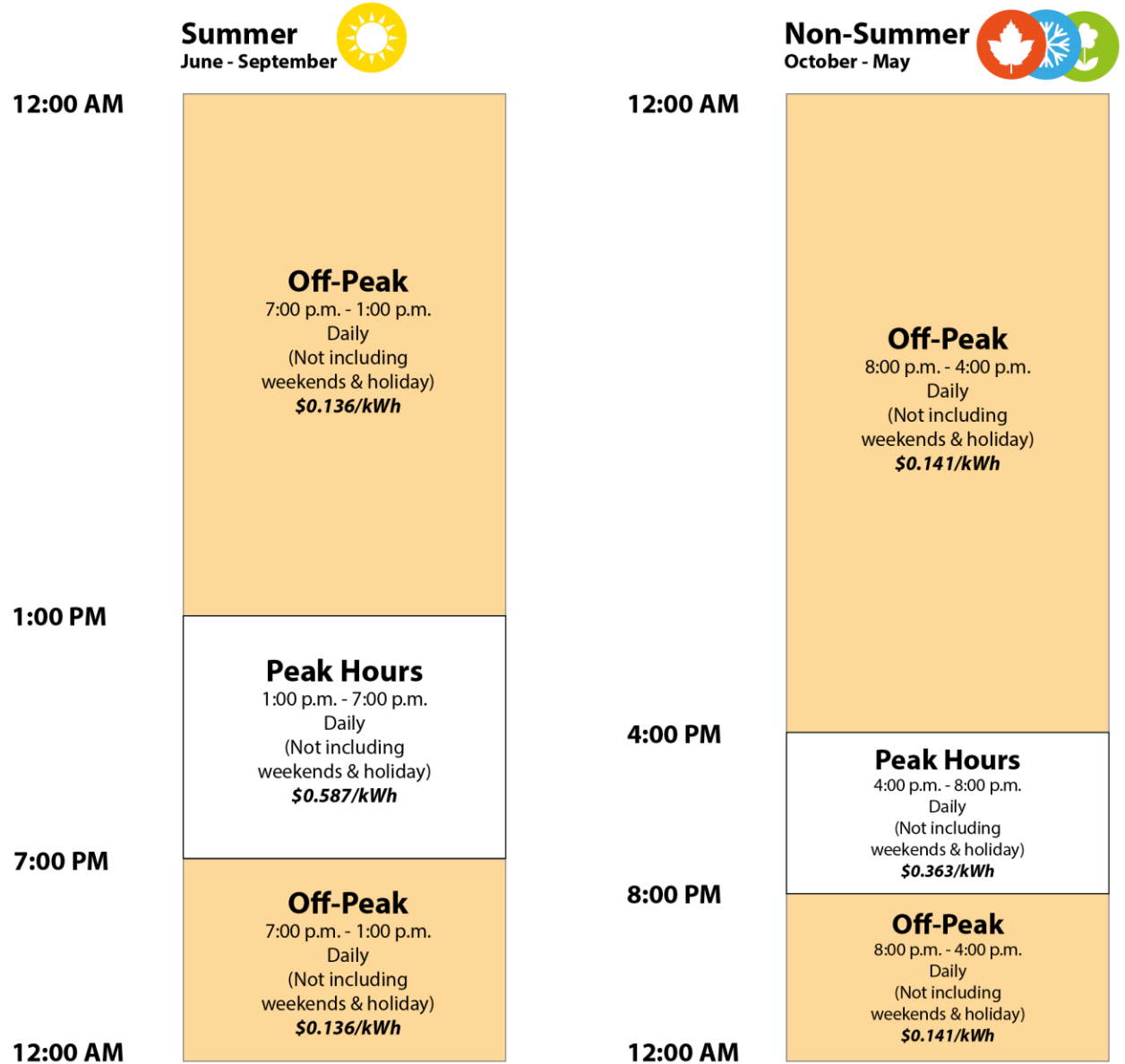
**July 19, 2023**



# Pilot Program Recap

- Who: 147 initial participants (ended with 142)
- What: Yearlong Pilot Program under Residential Time-of-Use Pilot Rate A TOU
- When: January 1 – December 31, 2022
- Why: Time of Use rates benefit utilities and customers by:
  - Lowering costs for customers who are able to shift their usage to off-peak times;
  - Lowering costs for Belmont Light by reducing peak supply costs;
  - Creating more opportunity for a greener power supply; Energy is more likely to come from the dirtiest fossil fuel sources during on-peak times.
  - Supporting strategic electrification

# Pilot Program Rate Schedule



# 6 Goals for Time of Use Pilot Program

Developed during discussions with Belmont Light, the Light Board Advisory Committee, and approved by the Municipal Light Board, these 6 goals provide the guiding principals of the Time of Use Pilot Program.

## #1 Align Customer Savings with Savings for Belmont Light

### Expected Outcomes

- Average Rate A customers with 20% load shifting: **\$6/month savings**
- Peak savings to Belmont Light: If pilot occurred in 2020, **\$124 per avoided kW** during annual FCM peak, **\$10.27 per avoided kW** during monthly RNS peaks (1 MW avoided peak load = -\$134k)
- High likelihood of capturing annual FCM peak and RNS peaks in **10/12 months**. Chances for April and October RNS lower, but these are our cheapest months.

## #2 Support Strategic Electrification

### Expected Outcomes

- Average EV customer with no behavior change: **\$7.50/month savings (5%)**
- Average EV customer with 20% load shift: **\$15/month savings (-9%)**
- Average heat pump customer with no behavior change: **\$5/ month savings (3%)**
- Average heat pump customer with 20% load shift: **\$11.75/month savings (8%)**

## #3 Protect Low-Income Customers

### Expected Outcomes

- Average low-income customer with no behavior change: **\$1/month savings (2%)**
- Average low-income customer with 20% load shift: **\$5.75/month savings (10%)**

## #4 Support Energy Efficiency and Solar

### Expected Outcomes

- Energy efficiency: **1-3% aggregate kWh reductions**
- Energy efficiency: **3-8% aggregate kWh shift to off-peak usage**
- Solar: Average solar customer with buyback and no behavior change: **\$10.50/month savings (13%)**
- Average solar customer with buyback and 20% load shift: **\$20/month savings (17%)**

## #5 Ensure Belmont Light Revenue Sufficiency and Stability

### Expected Outcomes

- Rate designed to be revenue neutral.
- Expect pilot to cost some money if only obvious "winners" are enrolled. Enrollee cap will help address this.
- Minimal budget increase for Belmont Light from buyback rate change.

## #6 Provide for Easy Implementation

### Expected Outcomes

- Rate structure compatible with Belmont Light's meter and billing systems.
- Rate design not too complicated for ratepayers.

# Goal 1: Align Customer Savings with Savings for Belmont Light

## Customer Usage w/ Rate A Comparison

Group	No. of Customers	Average Monthly Impact per Customer - Summer (Jun. 1 - Sep. 30)		Average Monthly Impact per Customer - Non-Summer (Jan. 1 - May 30; Oct. 1 - Dec. 31)		Average Impact per Customer - Total Year (Jan. 1 - Dec. 31)	
		Amount	% Change	Amount	% Change	Amount	% Change
All Rate A Customers	10,398	\$26.95	+22%	-\$9.92	-10%	+2.37	+2%
TOU Pilot - No Tech Customers	39	\$15.40	+15%	-\$12.85	-12%	-\$3.43	-3%

# Goal 1: Align Customer Savings with Savings for Belmont Light (cont.)

## Customer Usage w/ Rate A Comparison

Group	Summer On-Peak	Summer Off-Peak	Non-Summer On-Peak	Non-Summer Off-Peak
All Rate A Customers	31.18%	68.82%	21.04%	78.96%
TOU Pilot - No Tech Customers	27.10%	72.60%	18.30%	81.70%

# Goal 1: Align Customer Savings with Savings for Belmont Light (cont.)

## RSN Transmission/FCM Capacity Peaks

Month	Peak Type	Date	Day of Week	Hour Ending	During On-Peak Period?
January	Transmission	1/11	Tuesday	18	Y
February	Transmission	2/14	Monday	19	Y
March	Transmission	3/1	Tuesday	18	Y
April	Transmission	4/6	Wednesday	12	N
May	Transmission	5/22	Sunday	18	Y
June	Transmission	6/26	Sunday	18	Y
July	Transmission	7/21	Thursday	16	Y

# Goal 1: Align Customer Savings with Savings for Belmont Light (cont.)

## RSN Transmission/FCM Capacity Peaks (cont.)

Month	Peak Type	Date	Day of Week	Hour Ending	During On-Peak Period?
August	Capacity	8/4	Thursday	18	Y
August	Transmission	8/8	Monday	16	Y
September	Transmission	9/12	Monday	18	Y
October	Transmission	10/26	Wednesday	19	Y
November	Transmission	11/20	Sunday	18	Y
December	Transmission	12/12	Monday	18	Y

# Goal 2: Support Electrification

## Heat Pumps & Electric Vehicle Customer Impact

Group	No. of Customers	Average Monthly Impact per Customer - Summer (Jun. 1 - Sep. 30)		Average Monthly Impact per Customer - Non-Summer (Jan. 1 - May 30; Oct. 1 - Dec. 31)		Average Impact per Customer - Total Year (Jan. 1 - Dec. 31)	
ASHP	14	\$20.89	+15%	-\$27.77	-14%	-\$11.55	-6%
EV	17	\$10.33	+5%	-\$22.92	-15%	-\$11.84	-7%
ASHP & EV	8	\$8.28	+6%	-\$25.30	-14%	-\$14.10	-9%
All Customers	39	\$13.70	+8%	-\$25.15	-14%	-\$12.20	-7%

# Goal 2: Support Electrification (cont.)

## Heat Pumps & Electric Vehicle Customer Impact

Group	Summer On-Peak	Summer Off-Peak	Non-Summer On-Peak	Non-Summer Off-Peak
ASHP	26.97%	73.03%	16.70%	83.30%
EV	21.21%	78.79%	15.47%	84.53%
ASHP & EV	21.49%	78.51%	16.28%	83.72%
All Customers	23.02%	76.98%	16.14%	83.86%

## **Goal 3: Protect Low-Income Customers**

- **Extrapolation based on 2022 data for 236 Low Income customers**
  - **Around 2% of residential customer base**
- **Projecting 2022 usage onto TOU Energy Rates:**
  - **Average Customer Monthly Bill (TOU): \$90.88**
  - **Average Customer Monthly Bill (A-LI): \$62.02**
- **As no Low-Income customers were included in the Pilot Rate, we recommend evaluating any potential TOU rate for low-income customers during cost-of-service study**

# Goal 4: Support Energy Efficiency & Solar

Group	No. of Customers	Average Impact per Customer - Summer		Average Impact per Customer - Non-Summer		Average Impact per Customer - Total Year		Average Impact per Customer - Total Year	
		Value	%	Value	%	Value	%	Value	%
Solar	17	-\$46.93	-135%	\$5.22	12%	-\$12.16	-29%	-\$145.97	-29%
ASHP & Solar	10	-\$46.54	-111%	-\$14.99	-8%	-\$25.50	-18%	-\$306.06	-18%
EV & Solar	18	-\$49.62	-65%	-\$2.12	-3%	-\$17.95	-23%	-\$215.40	-23%
ASHP, EV & Solar	13	-\$32.13	-25%	-\$20.88	-9%	-\$24.63	-13%	-\$295.60	-13%
Battery Storage	4	-\$163.99	-90%	-\$32.30	-18%	-\$76.20	-42%	-\$914.37	-42%
All Customers	62	-\$52.10	-68%	-\$8.06	-6%	-\$22.74	-21%	-\$272.90	-21%

# Goal 4: Support Energy Efficiency & Solar (cont.)

## Solar Customers Usage '21 vs. '22 (Jan - Nov.)

Year	Summer On-Peak	Summer Off-Peak	Non-Summer On-Peak	Non-Summer Off-Peak	Total On-Peak	Total Off-Peak
2021	28.14%	71.86%	19.82%	80.18%	22.89%	77.11%
2022	24.53%	75.47%	16.96%	83.04%	19.68%	80.32%
Difference	3.61% shift to off-peak		2.86% shift to off-peak		3.21% shift to off-peak	

Year	On-Peak (kWh)	Off-Peak (kWh)	Total (kWh)
2021	135,531	456,628	592,159
2022	117,666	480,123	597,789
Difference	-17,865	23,495	5,630

# Goal 5: Ensure Belmont Light Revenue Sufficiency & Stability

## Revenue Analysis

Time of Use Revenues were compared with a) the actual cost of power and b) the potential revenues if collected through Rate A.

### REVENUE ANALYSIS

	JAN-MAY 2022		JAN-MAY 2023		2022		2023 EST	
	\$	%	\$	%	\$	%	\$	%
<i>Cost &amp; Revenue</i>								
Transmission Over / (Under)	\$ 1,547.71	11%	\$ (3,606.00)	-24%	\$ (2,503.29)	-7%	\$ (5,724.37)	-17%
Generation Over / (Under)	\$ (19,953.70)	-33%	\$ (26,218.29)	-42%	\$ (22,748.45)	-17%	\$ (23,878.01)	-19%
<i>Rate A Comparison</i>								
Transmission Over / (Under)	\$ (480.01)	-3%	\$ 5,731.09	38%	\$ (2,846.13)	-8%	\$ 14,078.62	42%
Generation Over / (Under)	\$ (8,753.87)	-14%	\$ (2,473.99)	-4%	\$ (12,604.08)	-10%	\$ 13,162.64	11%
<i>Weighted Average (Tx+Gen), %</i>		-25%		-39%		-15%		-19%

- Total year-end 2023 estimation is done based on a combination of 2023 budget data and prior year actuals.

# Goal 5: Ensure Belmont Light Revenue Sufficiency & Stability (cont.)

## Buyback Analysis

Analysis of the cost to Belmont Light if power was purchased off the grid  
(Generation & Transmission Costs):

### Assumptions:

- Buyback TOU customers with buyback DO NOT increase transmission and capacity charges
- Peak load is a total of buyback feed and usage of Buyback TOU customers group

### BUYBACK ANALYSIS

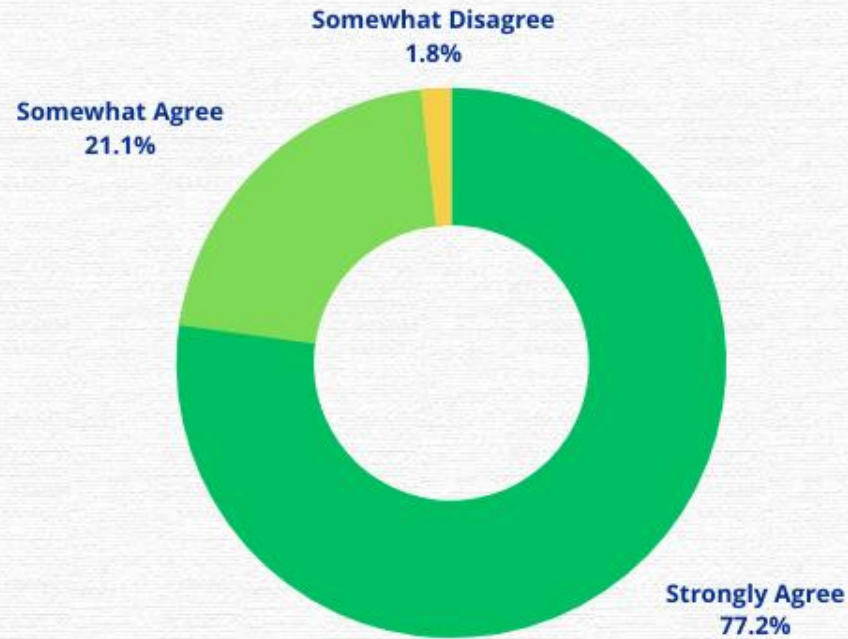
	JAN-MAY 2022		JAN-MAY 2023		2022		2023 EST	
	\$	%	\$	%	\$	%	\$	%
Buyback credit vs estimated cost of grid power for TOU buyback customers	\$ (3,068.10)	-24%	\$ (3,811.70)	-30%	\$ 4,469.85	14%	\$ 8,311.82	31%

# Goal 6: Provide for Easy Implementation

- **Time of Use Rates are compatible with Belmont Light's meter and billing systems.**
  - **Smart meter rollout completed in 2017 with Time of Use Rates in mind.**
  - **Billing system, NISC, has the capability for Time of Use Rates, however, there were multiple "hiccups" throughout the Pilot Program.**
- **Rate design has proven to not be too complicated for Pilot Program participants.**
  - **Method of evaluation: Pilot Program Survey**
    - **Completed December 2022-January 2023**

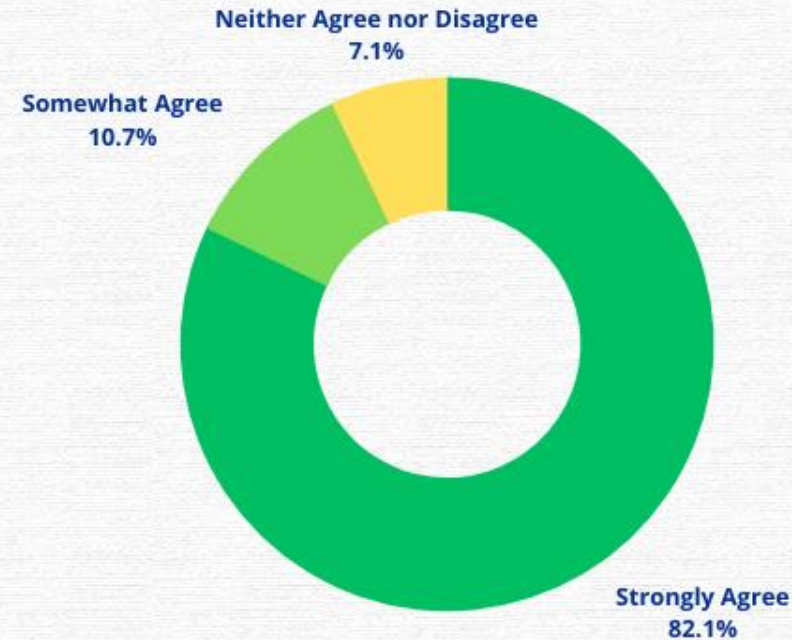
# Goal 6: Provide for Easy Implementation (cont.)

"The Program is Easy to Understand"



**AGREE** 98.25%  
**DISAGREE** 1.75%

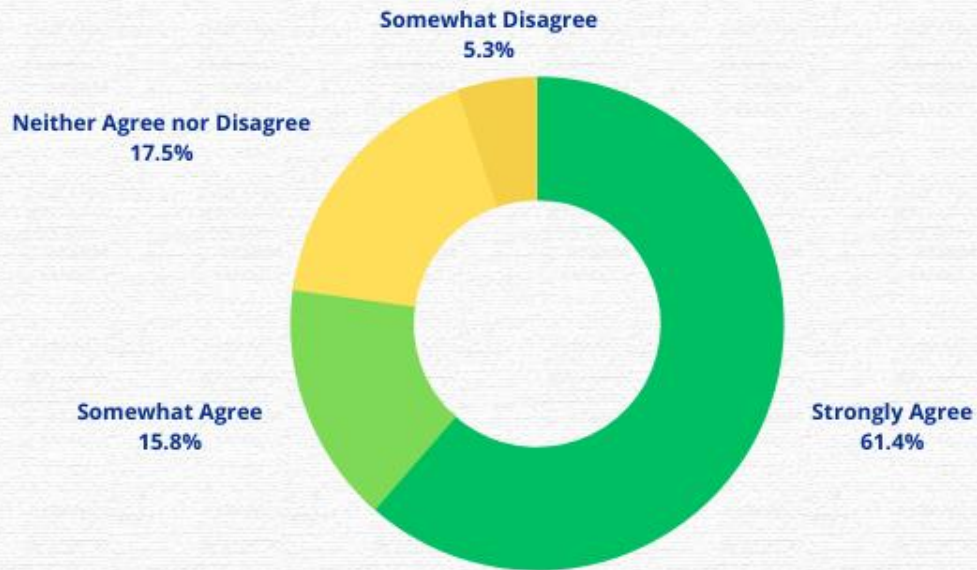
"It has been easy to make changes around the house"



**AGREE** 89.47%  
**DISAGREE** 5.26%  
**NEITHER** 5.26%

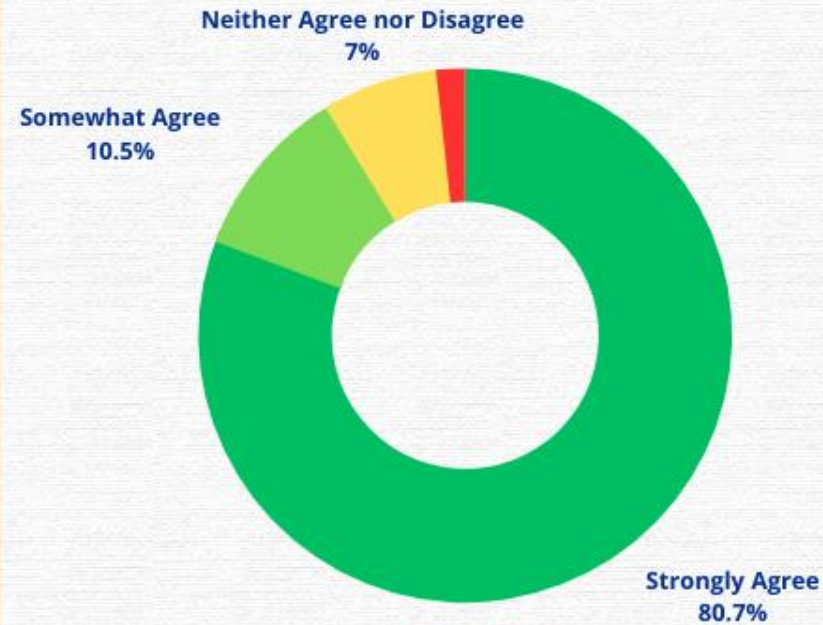
# Goal 6: Provide for Easy Implementation (cont.)

"I am seeing savings using the TOU rate"



<b>AGREE</b>	<b>77.19%</b>
<b>DISAGREE</b>	<b>5.26%</b>
<b>NEITHER</b>	<b>17.54%</b>

"I would want to sign on a permanent TOU rate..."



<b>AGREE</b>	<b>91.23%</b>
<b>DISAGREE</b>	<b>7.02%</b>
<b>NEITHER</b>	<b>1.75%</b>

# Evaluation of 6 Goals

## #1 Align Customer Savings with Savings for Belmont Light

### Expected Outcomes

- Average Rate A customers with 20% load shifting: **\$6/month savings**
- Peak savings to Belmont Light: If pilot occurred in 2020, **\$124 per avoided kW** during annual FCM peak, **\$10.27 per avoided kW** during monthly RNS peaks (1 MW avoided peak load = ~\$134k)
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## #6 Provide for Easy Implementation

### Expected Outcomes

- Rate structure compatible with Belmont Light's meter and billing systems.
- Rate design not too complicated for ratepayers.

- Maintain Time of Use Pilot Rate A TOU
  - Allow current participants to opt out but don't allow new participants to opt in
  - Continue to investigate greater impact of high adoption from Rate A customers
- Analyze TOU Rate during next Cost of Service Study
- During COSS, conduct separate investigation into feasibility of a TOU-Low Income rate

# More Information

[www.BelmontLight.com/timeofuse](http://www.BelmontLight.com/timeofuse)

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