

# Welcome to BC Hydro's

## 2024 Rate Design Applications (RDA) Workshop

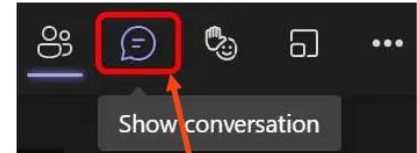
We'll be getting started shortly

### How to participate

- Let us know you're here. **Please enter your first name, last name, and organization in the chat.**
- Video and microphone have been turned off to save bandwidth and eliminate background noise
- The chat function is available for questions and comments
- A copy of this presentation will be made available following this session

### Technical issues?

- Send an email to [bchydroregulatoryfeedback@bchydro.com](mailto:bchydroregulatoryfeedback@bchydro.com)



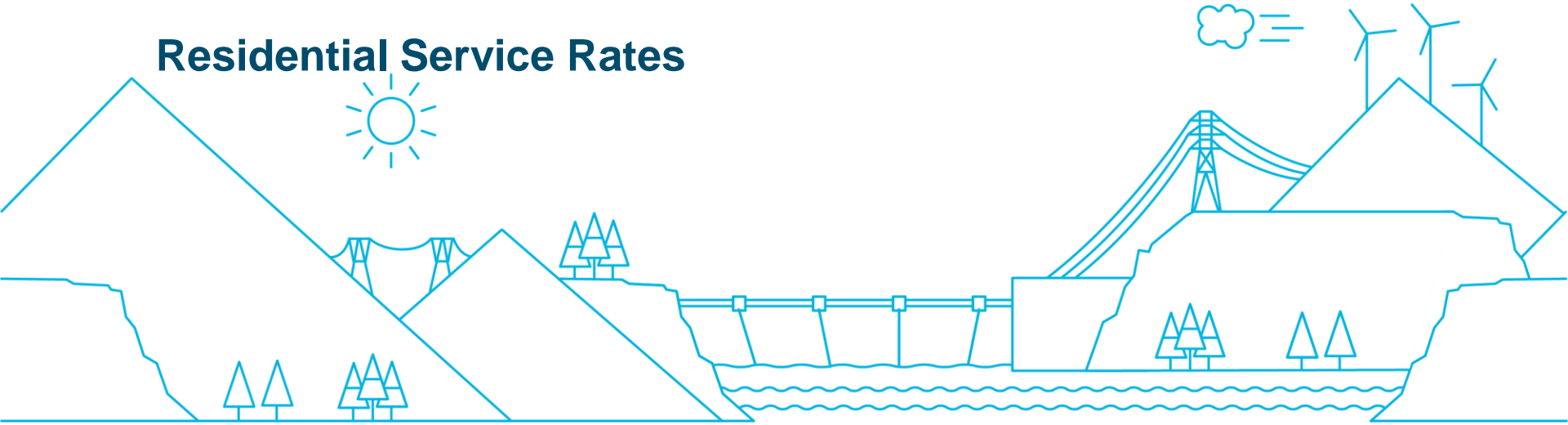
Click on this icon  
to access the chat

# BC Hydro 2024

## Rate Design Applications

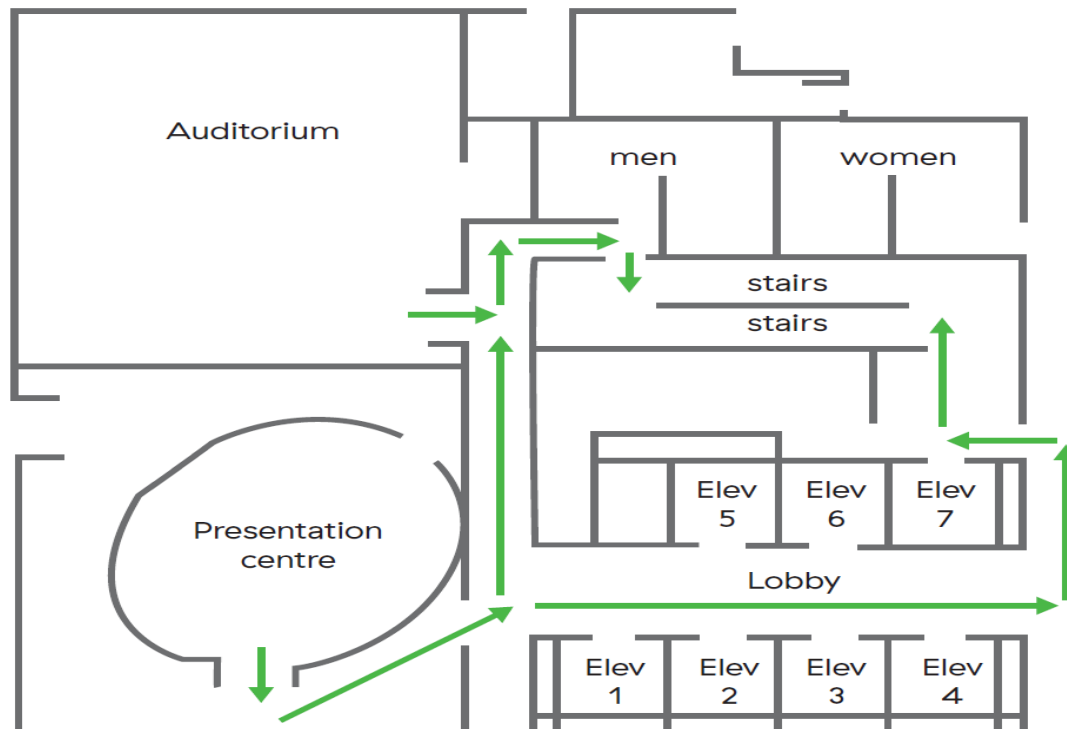
### Workshop 2

#### Residential Service Rates



March 13, 2024

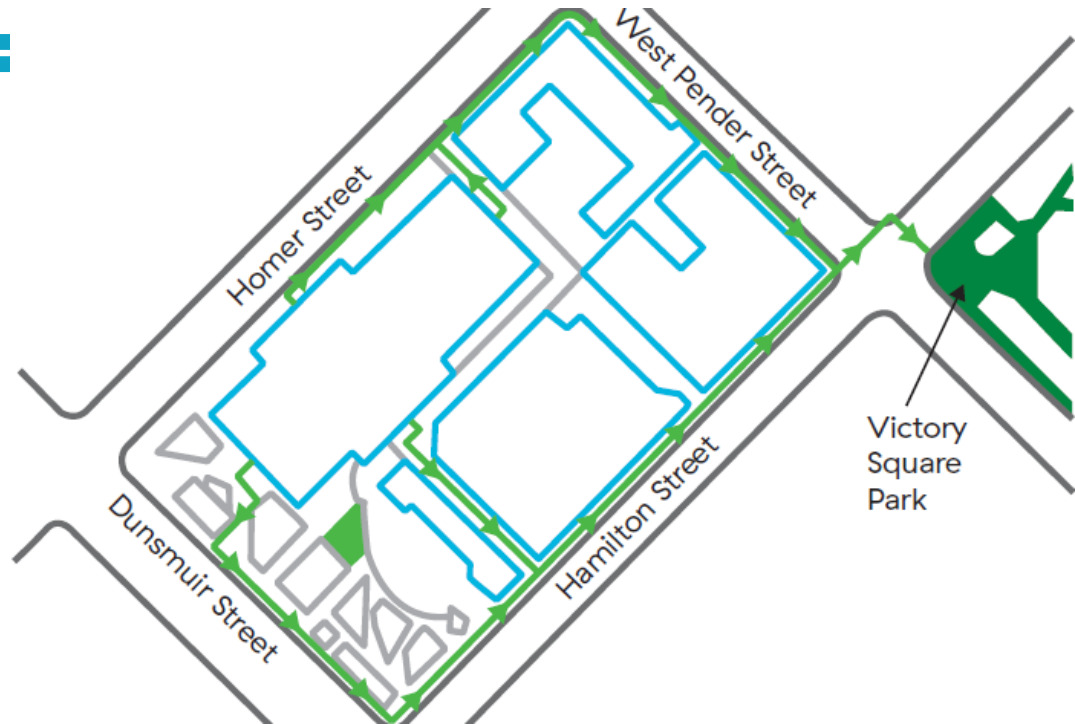
# Safety - Evacuation Route for Dunsmuir 2 Auditorium



# Safety –

## Muster Location:

## Victory Square



*We are grateful to be meeting today  
on the unceded traditional territory of the  
Musqueam, Squamish and Tsleil-Waututh First Nations*

# Agenda

Time	Topic	Presenter
9:00 – 9:10 am	Welcome	Jen Thompson, Facilitator
9:10 – 9:25 am	Rates and Regulatory Overview	Chris Sandve, Chief Regulatory Officer
9:25 – 10:15 am	Residential Rate Design in B.C.	Sanem Sergici, The Brattle Group Ryan Hledik, The Brattle Group
10:15 – 10:45 am	Residential Rate Design Options	Cynthia Curll, Regulatory Manager
10:45 – 11:00 am	Break	
11:00 – 11:45 am	Transition and Implementation	Shiau-Ching Chou, Senior Regulatory Manager
11:45 am – 12:00 pm	Next Steps	Chris Sandve, Chief Regulatory Officer



# **Rates and Regulatory Overview**

**Chris Sandve**

**Chief Regulatory Officer**

# BCUC Decision (from Pricing Principles Application)

- BC Hydro was directed to file an application for changes to Residential Inclining Block (RIB) Rate by **June 30, 2024**.
- Must include evaluation of **potential changes to, or elimination of, the RIB Rate** considering:
  - Alignment with marginal costs and cost of service
  - How the revised rate design supports government policy of electrification and decarbonization
  - Whether revised rate design provides greater flexibility to modify rates over time or add optional rates



# 2024 Applications

## Residential Rates

- Update RIB Rate
- Introduce 1-2 more optional rates
- Other updates

## Net Metering Rate

- Update Net Metering rate
- Optional Net Metering TOU Rate
- Other updates

## Non-Integrated Area Rates

- Residential rates
- Commercial rates
- Distribution extension charges

## Tariffs Terms & Conditions

- Tariffs terms and conditions
- Standard charges

## Distribution Extension Policy

- Update distribution extension charges
- Standard connection charges

**Target Filing Date: June 28, 2024**

# Residential Rates Engagement

	2023	2024	
	Oct – Nov	Feb – Mar	Apr – May
Customers	<ul style="list-style-type: none"> <li>• Survey</li> <li>• Digital Dialogue</li> </ul>	<ul style="list-style-type: none"> <li>• Survey</li> <li>• One-on-One Interviews</li> </ul>	<ul style="list-style-type: none"> <li>• TBC</li> </ul>
Stakeholders	<ul style="list-style-type: none"> <li>• Workshop #1</li> </ul>	<ul style="list-style-type: none"> <li>• Workshop #2</li> </ul>	<ul style="list-style-type: none"> <li>• Final Workshop</li> </ul>
<b>Target Filing Date: June 28, 2024</b>			

# Our Progress Since November 2023

## Workshop

1. Finalizing Discussion Paper – The Brattle Group
2. Phase 1 customer and stakeholder workshop results
3. Developing rate designs reflecting 1 & 2
4. Engagement, transition and implementation

# Objectives for this morning's session

- Share final discussion paper on jurisdiction review and relevant rate design trends
- Review rate design concepts and customer impacts
- Discuss transition and implementation
- Review next steps

# Current Rate Offers



## Residential Inclining Block Rate

Two-tier pricing with a higher energy charge for consumption above a set threshold. Intended to encourage conservation. Most residential customers are on this rate.



## Flat Rate

A fixed energy charge for all electricity consumed. Available to approximately 15,000 eligible Zone I farms and Zone IB (Bella Bella) residential customers.



## Time-of-Day Rate

Encourages customers to shift consumption from BC Hydro's system peak hours. (Approved by the BCUC in December 2023. To be launched in June 2024)

# Residential Rate Design in British Columbia: Key Issues for Consideration

## PREPARED BY

Sanem Sergici  
Ryan Hledik

## PREPARED FOR

BC Hydro

BC HYDRO STAKEHOLDER MEETING  
MARCH 13, 2024



# Agenda

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1. Issues addressed in the whitepaper
2. Considerations for rate choice implementation
3. Q&A

# Introduction

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Following the November 2023 meeting, we finalized the “Rate Choice” discussion paper

The purposes of this discussion paper:

- To introduce a range of new rate designs to be considered by BC Hydro and stakeholders
- To discuss considerations when potentially moving forward with those options

We have provided evidence and perspective from other jurisdictions on eight areas BC Hydro has identified as important

We have also incorporated feedback received during and after the November 2023 meeting



# The 8 issues addressed in our paper

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1. Current trends in residential rate design
2. How/why other jurisdictions have provided rate choice
3. Implications for providing increased rate choice
4. Whether end-use rates should be considered
5. How other utilities have aligned average and marginal costs in rate design
6. The various rate choices that BC Hydro may wish to prioritize in evaluating
7. How other jurisdictions have mitigated bill increases when changing rate designs
8. How other jurisdictions have addressed customer ability to pay for electricity

# Increased rate choice is becoming the new norm

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We reviewed the residential rate offerings of 23 large utilities in Canada and the United States, comparable to BC Hydro in customer count

Of the 23 utilities, 17 offer at least three rate options

- Most of the “default rates” are flat rates or inclining block rates
- Most of the alternative rate choices have TOU and/or demand charge elements
- Several jurisdictions offer rates targeting electric heating customers
- A few jurisdictions offer fixed bills
- A few others offer more dynamic rate options such as CPP rates

## RATE CHOICE

# Summary of Residential Rates offered by large North American Utilities

Canada		# cust. (000s)	Flat	Inc. block rate	Dec. block rate	Comb. block rate	2-per TOU	3-per TOU	CPP	Demand charge	Fixed Bill	Heating rate	Other	Total
Province														
BC Hydro	BC	2,189		✓				✓						2
Hydro-Quebec	QC	4,317		✓					✓	✓		✓	✓	5
Hydro One	ON	1,334		✓									✓	3
Alectra Utilities	ON	991		✓				✓					✓	3
Toronto Hydro	ON	773		✓				✓					✓	3
ENMAX	AB	675	✓											1
Manitoba Hydro	MB	587	✓											1
FortisAlberta	AB	563	✓											1
SaskPower	SK	538	✓											1
Nova Scotia Power	NS	520	✓				✓		✓			✓		4
United States		# cust. (000s)	Flat	Inc. block rate	Dec. block rate	Comb. block rate	2-per TOU	3-per TOU	CPP	Demand charge	Fixed Bill	Heating rate	Other	Total
State														
Florida Power & Light	FL	5,739		✓			✓				✓			3
Southern California Edison	CA	3,881		✓				✓				✓	✓	4
Duke Energy Carolinas	NC, SC	2,765	✓				✓			✓		✓	✓	5
Dominion	VA	2,725				✓	✓			✓		✓		4
Georgia Power	GA	2,713		✓			✓	✓		✓	✓		✓	6
Pacific Gas & Electric	CA	2,269		✓			✓	✓						3
PacifiCorp	OR, CA, WA	2,003	✓	✓										2
Duke Energy Florida	FL	1,900		✓				✓				✓		3
Duke Energy Progress	NC, SC	1,689			✓		✓		✓	✓				4
Xcel Energy (MN)	MN	1,539	✓				✓	✓					✓	4
Xcel Energy (CO)	CO	1,536	✓					✓		✓				3
Alabama Power	AL	1,510				✓	✓		✓	✓			✓	5
Arizona Public Service	AZ	1,344	✓					✓		✓				3
<b>Total (US and CA utilities)</b>			<b>10</b>	<b>11</b>	<b>1</b>	<b>2</b>	<b>9</b>	<b>11</b>	<b>3</b>	<b>8</b>	<b>3</b>	<b>6</b>	<b>9</b>	

# Considerations for providing rate choice

## Potential advantages

- **Improved customer satisfaction**
  - More products to choose from, including options to reduce bills
  - Offer a few meaningful options instead of a large number of options
- **Economically efficient electricity consumption**
  - Improved system utilization
  - Bill savings
- **Achievement of policy goals**
  - New cost-based rates may improve economics of new technologies necessary for meeting decarbonization goals
- **Improved energy affordability**
  - Bill saving opportunities for lower income customers if they have favorable load profiles
  - Lower system cost will lead to lower rates

## Challenges to be addressed

- **Utility revenue loss**
  - Mostly a risk in the short term, but should be managed regardless
- **Customer education and outreach**
  - Benefits of rate choice will only bear out if sizable number of customers make the switch
  - Robust customer education and outreach take time and resources
- **Customer confusion**
  - Too many options is not necessarily good for customers
  - Investment in online tools and data analytics may be needed to help customers make informed decisions
  - Well-trained customer service reps
- **Bill increases for some customers**
  - Need to build robust internal capabilities to explain customers “what happened” and guide them towards a better choice given their usage patterns

# Considerations for end-use specific rates

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## **As a general matter, it is preferable to offer technology-neutral rates**

- Cost-based rates still can be designed with a technology's operating characteristics in mind
- Policy goal of subsidizing technology more efficiently achieved through other means

## **However, some conditions could support end-use rates**

- If demonstrated that customers with certain technology have different cost to serve
- If there is a legacy end-use rate, then a gradual transition to cost-based rates may be needed
- When there is a critical, urgent policy goal, temporary rate discounts have been used by some utilities. But it's a slippery slope.

### Residential costs are recovered through different rate design elements

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**Ideally price signals reflect marginal costs while recovering revenue requirement. However, marginal costs rarely match embedded costs**

- One approach is to reflect marginal price signals in the rate design to the extent possible, while still ensuring the recovery of the embedded costs
- Various degrees of marginal pricing can be integrated into alternative rate choices

**The choice of the rate design elements is a critical consideration. Under a perfectly cost-reflective rate design...**

- All customer-related costs would be covered through a fixed basic charge
- Demand related costs would be covered through a demand-related charge
- Energy related costs would be covered through a volumetric charge
- ... but this has rarely been the practice in North America and elsewhere; this approach could result in up to 50% of the utility costs to be recovered through non-volumetric charges

## Minimizing distortion of price signals is a priority in rate design

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### Recovery of customer-related costs

- Based on a survey of dozen utilities, we found that the basic charge (or customer charge) recovers 15% to 75% of the customer-related costs
- Definition of the customer related costs also vary by utility. Broadest definition includes: meters, billing, service lines, transformers, overhead, and underground
- BC Hydro defines customer-related costs as those related to meters, billing, and a portion of the costs associated with service lines and transformers. BC Hydro's current residential basic charge recovers approximately 60% of these customer-related costs.

### Recovery of demand related costs

- Since demand charges are not common for the residential class at this time, demand-related costs are recovered through basic charge and/or volumetric charge
- In the absence of demand charges, coincident peak related costs can be collected through the peak period of a time-varying volumetric rate

## Rate choices already offered/proposed by BC Hydro

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### **Inclining block rate**

- *May* provide an efficiency incentive
- But difficult to establish a cost basis (cost do not increase over billing cycle)
- Not recommending to prioritize at this time

### **Time-of-use (TOU rate)**

- Recently proposed by BC Hydro
- Further changes not recommended until gaining experience with rate offering

### **Peak Time Rebates (PTR)**

- BC Hydro offers it as a demand response program
- Can be effective in producing demand reductions when offered on an opt-out basis



# Rate choices BC Hydro may wish to consider now

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## **Flat volumetric rate**

- Most common residential rate design
- Could establish foundation for other rate choices

## **Demand-based rate**

- Useful for recovering demand-based grid costs
- Can be combined with other rate features and measured/billed in a variety of ways

## **Critical peak pricing (CPP)**

- Provides stronger/more dynamic signal than simple TOU (and can be combined with TOU)
- Could appeal to customers with high degree of flexibility, orientation toward bill savings

## **Subscription Pricing “plus”**

- An entirely fixed monthly charge for electricity
- Based on the customer’s historical weather normalized usage plus a risk premium
- The “plus”: Offer is coupled with energy efficiency or demand flexibility measures as a prerequisite for enrollment, to otherwise address lack of incentive for efficient consumption

# Appealing to a diverse customer base

Rate choice is most effective when the menu of options meaningfully different options addresses the needs of a diverse customer base

Customer Segment	IBR (RIB Rate)	TOU	Flat	Demand Charge	CPP	SP+
Low usage	✓			✓		
High usage			✓			
Flexible		✓		✓	✓	✓
Prefers simplicity			✓			✓
Considering EV		✓			✓	
Considering heat pump				✓		
Considering efficiency upgrade	✓		✓			✓

## Understanding and mitigating bill impacts is key to a successful implementation of rate choice

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### **First, conduct bill impact analysis using historical load data**

- Ideally conducted for specific sub-segments of customers
- Should capture multiple years of weather conditions, annual and seasonal

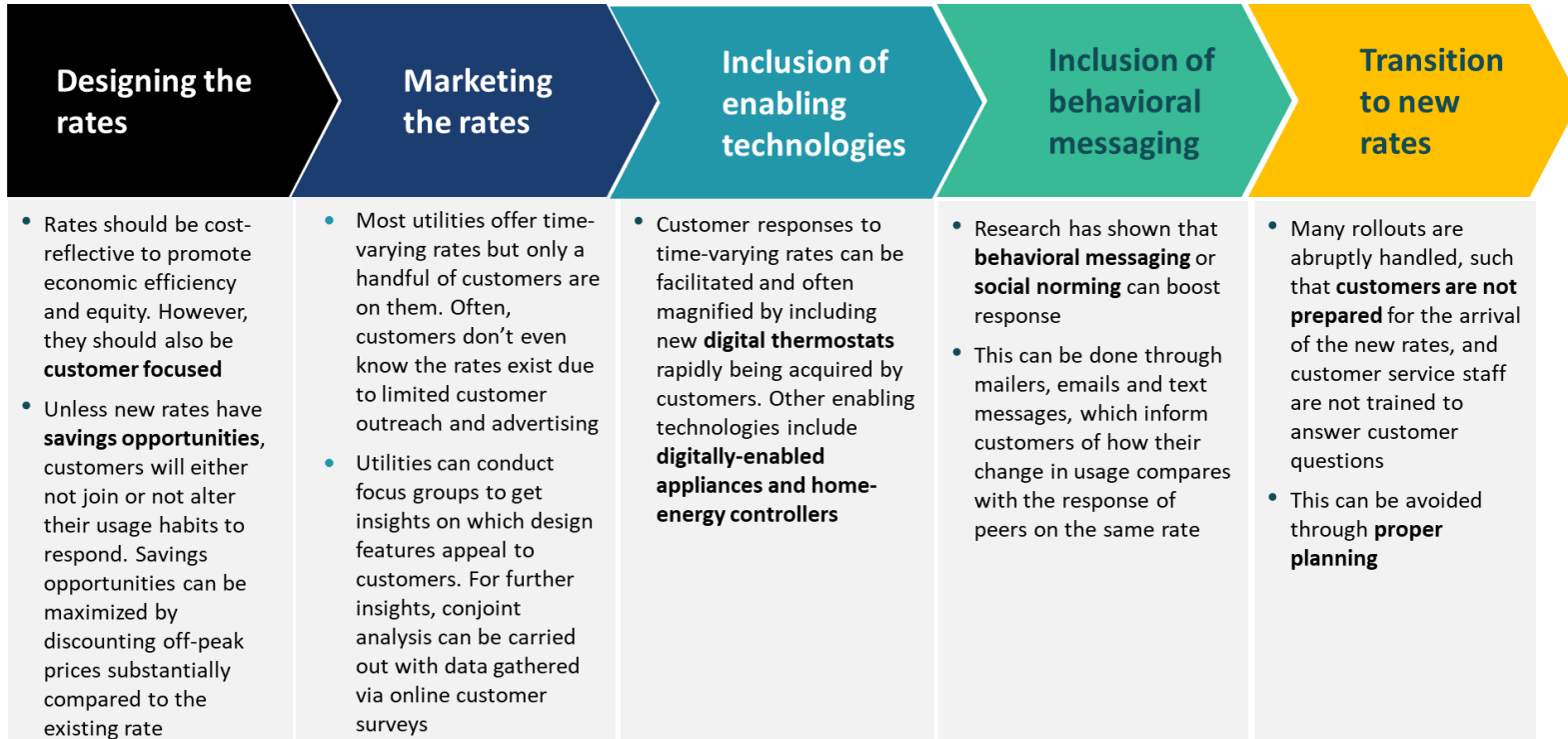
### **Then, identify options for mitigating large bill changes. Examples:**

- Initial departure from purely cost-based rate, with gradual ongoing move in that direction
- Temporary bill protection
  - Can be limited to extreme cases (i.e., bill won't increase more than 10%)
  - Can be accompanied with shadow bills
- Introduce rate design change separately from overall rate increase
  - Avoid perception that bill increase is attributable to rate design

## We identified five types of bill discount programs and their pros/cons

Program	Description	Pros	Cons
<b>1- Flat Percentage Discount Programs</b>	Payments to reduce the bill by a certain percentage	- Low administrative burden for utility	- Not tailored to different income levels
<b>2- Flat Dollar Amount Discount Programs</b>	Payments to reduce the bill by a flat dollar amount	- Least administrative burden for utility  - No distortions to price signals	- Not tailored to different income levels or bill amounts
<b>3- Rate Discount Programs</b>	Discount applies to portions of the rate rather than the total bill	- Low administrative burden	- More complex than flat bill discounts  - Distorts price signals and may lead to inefficient usage
<b>4- Tiered Discount Programs</b>	Discounts are determined based on income tiers	- Lower complexity than PIPP, while accounting for different income levels to some extent	- High administrative burden for utility since it still requires determination of customers' tiers and discount levels
<b>5- Percentage of Income Payment Plans (PIPP)</b>	Payments to cap bills at a set percentage of household income	- Tailored to individual customers  - Energy burden does not increase with rate hikes	- Highest administrative burden for utility  - Acquisition of customer income data may be difficult

# Key lessons learned during the past two decades of rate transitions



# Questions?

# Rate Design Options

**Cynthia Curll**

**Regulatory Manager**

# Rate Options We Are Exploring

## Brattle Recommends

- Flat volumetric rate
- Demand-based rate
- Critical peak pricing
- Subscription pricing “plus”



## Customer Feedback

- Flat (26%)
- Time-of-Use (32%)
- Inclining Block (34%)
- Time of Year – lower winter bills (34%)



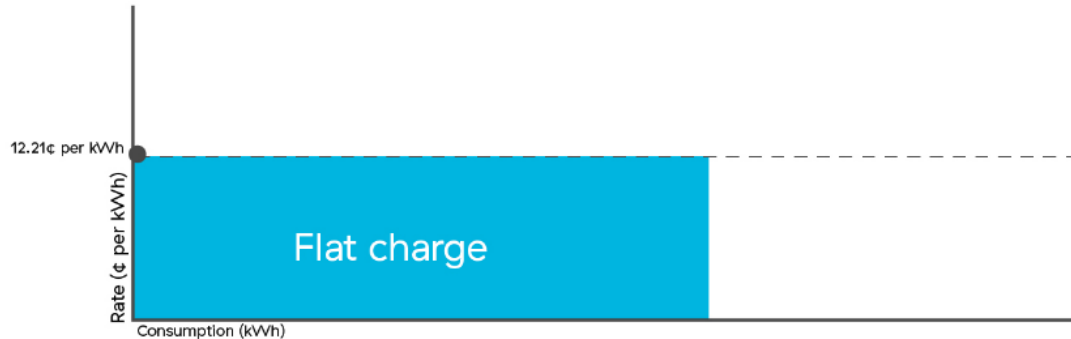
## BC Hydro Advanced

- Flat
- Fixed Bill Plus
- Peak Charge
- Time-of-Day (approved)



# Flat Volumetric Rate - Flat Rate

- BC Hydro's default Residential rate prior to the introduction of RIB Rate.
- Existing rate for approximately 15,000 Zone I farms and Zone IB Residential customers.
- Energy charge falls between Tier 1 and Tier 2 energy charges (10.97 ¢ per kWh and 14.08 ¢ per kWh)



Basic Charge 24.03¢ per day



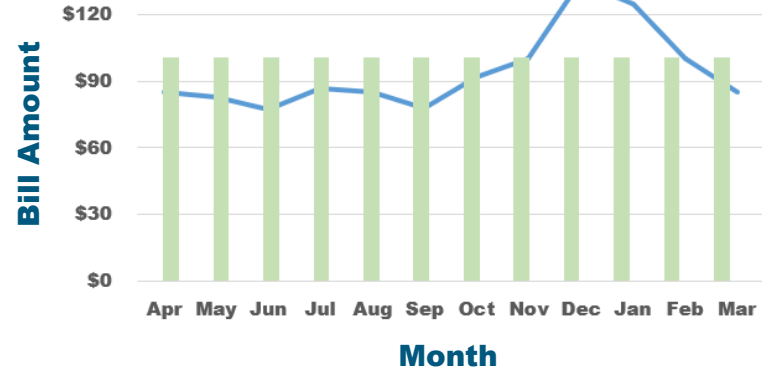
**BC Hydro proposes to amend this rate's Availability criteria to make it available to all Residential customers.**

# Subscription Pricing Plus - Fixed Bill Plus

- Customers pay a fixed monthly bill (with no annual true up) based on their past year consumption.
- Available to customers with smart devices and are willing to let BC Hydro control the devices.

The risk of consumption increase is offset by energy and capacity savings benefits.

Monthly Bills



# Demand-Based Rate - Peak Charge Rate

- Customers pay a lower energy charge than the Flat Rate.
- A peak charge applies to the highest hourly consumption above a certain threshold during the On-Peak period (4 pm to 9 pm) in a monthly billing period.
- Demand-based rates best reflect utilities' cost of service.
- Opportunity to save on bills if you spread usage out over On-Peak hours.

**DO**

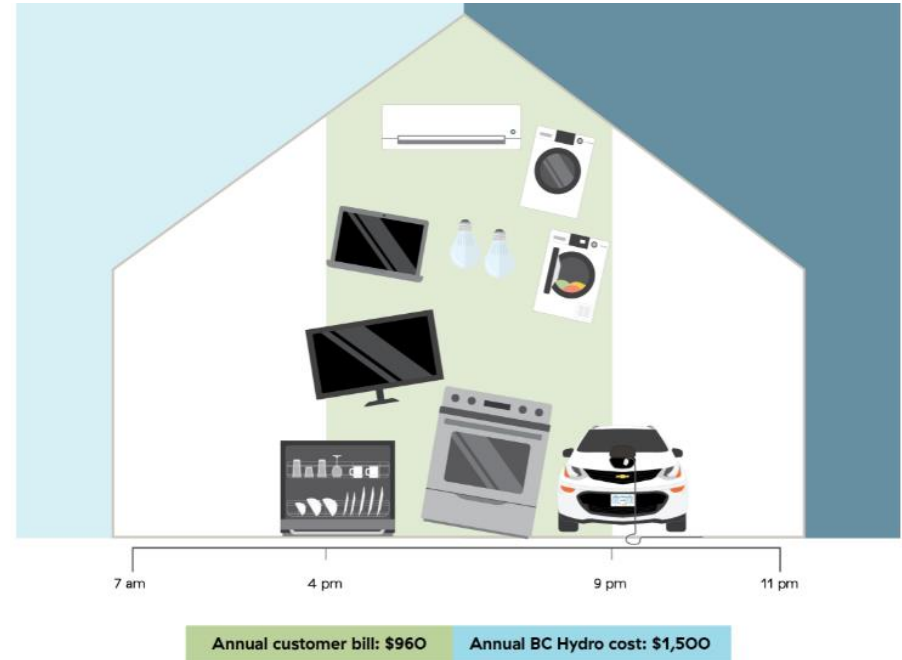
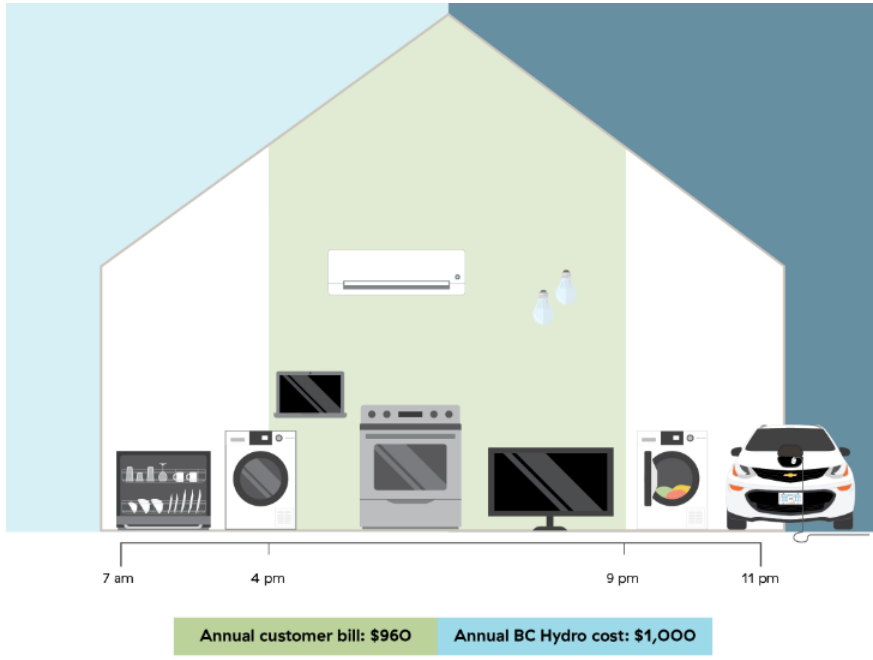


**DON'T**



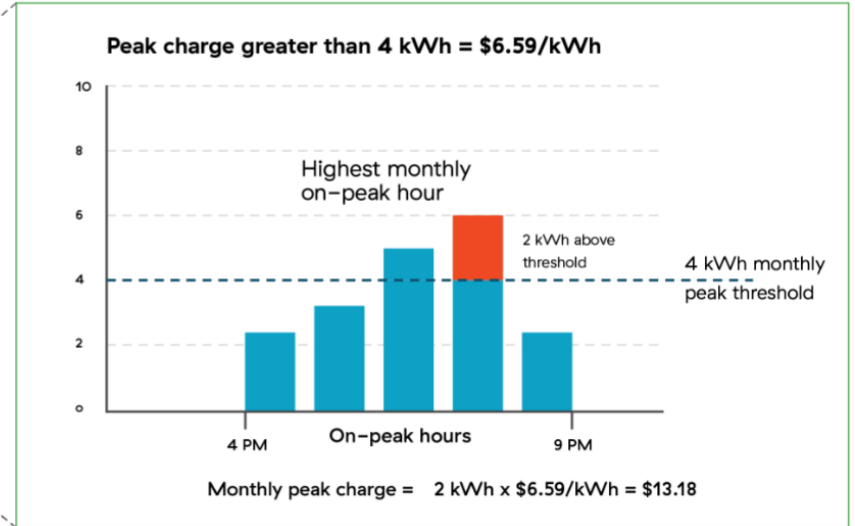
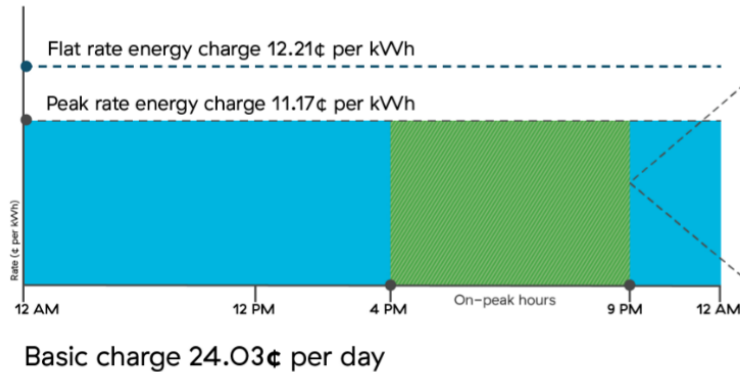
# The need to manage capacity

Customers with the same annual consumption and bills have different costs to serve



# Illustrative Peak Charge Rate

- **Basic charge:** 24.03 ¢ per day (the same as the Flat Rate)
- **Peak charge:** \$6.59 per kWh (marginal T&D demand costs) above 4 kWh (median Residential On-Peak period peak hourly consumption)
- **Energy charge:** 11.17 ¢ per kWh (calculated residually)



# Peak Charge Rate Design Elements

## Peak charge threshold

A free block below threshold allows Residential customers to carry out their necessary daily routines without triggering the charge.

**Higher threshold:** diminishes the price signal.

**Lower threshold:** impacts customer acceptance.

## Peak charge amount

A higher peak charge results in lower energy charge and vice versa.

**Higher charge:** higher customer impact when the charge is triggered.

**Lower charge:** lower price signal.

## Percentage of customers triggering the peak charge

Threshold (kWh)	Never	Sometimes	Always
3	14%	47%	39%
4	26%	53%	21%
5	40%	50%	10%
6	54%	41%	5%
7	66%	32%	2%

## Peak charge vs. energy charge (assuming 4 kWh threshold)

Peak Charge (\$/kWh)	Energy Charge (¢/kWh)	Note
\$3.30	11.66	50% of T&D marginal costs
\$6.59	11.17	T&D marginal costs
\$8.00	10.97	Energy charge = RIB Tier 1
\$14.53	10.04	Fully embedded demand cost
\$17.36	9.60	G, T&D marginal costs

# Break



# Transition & Implementation

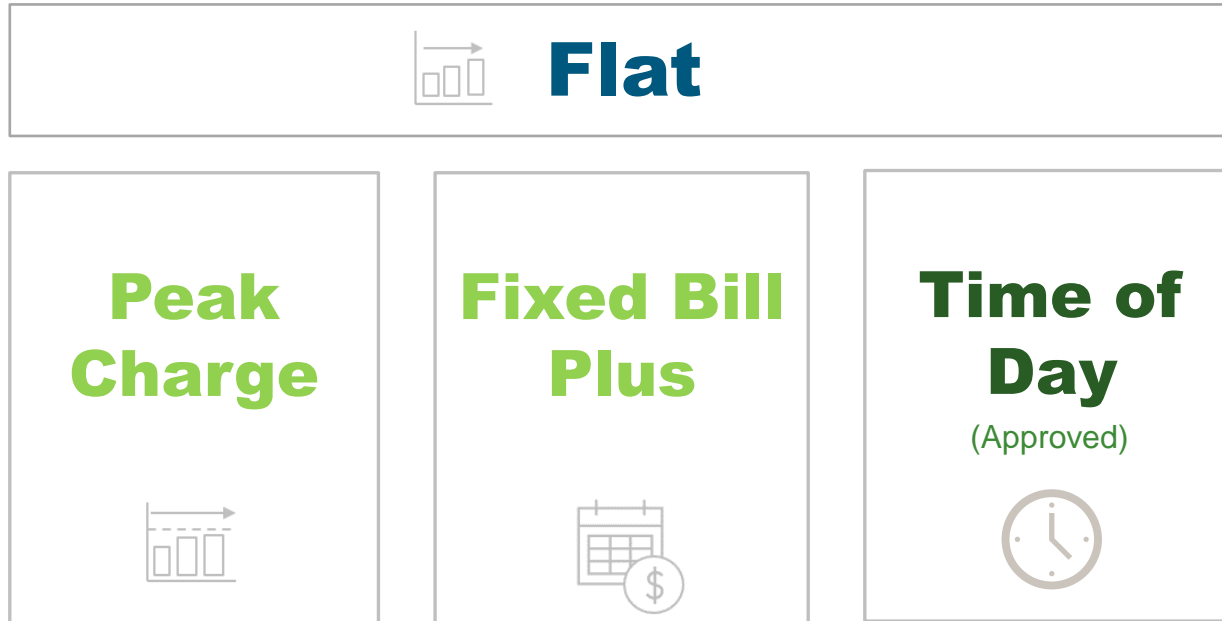
**Shiau-Ching Chou**

**Senior Regulatory Manager**



# Future Rate Offers

Relative to the Flat rate, customers have an opportunity to save under optional rates through behavioural changes.



# Residential Inclining Block (RIB) Rate

## The future of RIB Rate

- **Option 1**

Terminate RIB Rate  
rates are effective

- **Option 2**

Continue to freeze  
charge until the RIB  
(estimated to happen

- **Option 3**

Phase out RIB rate over a period of  
time (e.g., 3 or 5 years) by evenly  
decreasing the gap between Tier 1  
and Tier 2 energy charges.

**UPDATED**  
See next slide

r 2

Tier 1 Energy Charge 10.97¢ per kWh +  
Tier 2 Energy Charge 14.08¢ per kWh +  
Basic Charge 24.03¢ per day

# Residential Inclining Block (RIB) Rate

## The future of RIB Rate

- **Option 1**

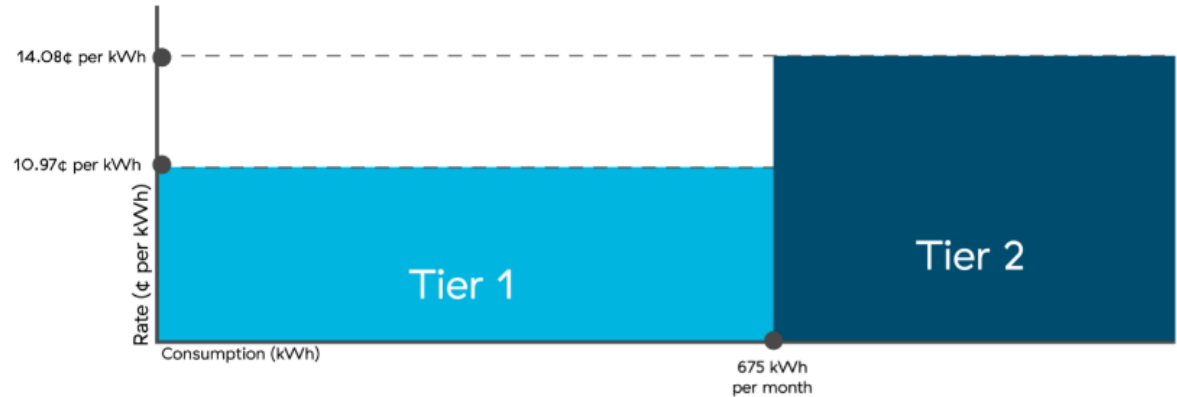
Terminate RIB Rate when the new rates are effective.

- **Option 2**

Continue to freeze Tier 2 energy charge until the RIB Rate is flattened (estimated to happen in F2028).

- **Option 3**

Phase out RIB rate over a period of time (e.g., 3 or 5 years) by evenly decreasing the gap between Tier 1 and Tier 2 energy charges.



Tier 1 Energy Charge 10.97¢ per kWh +

Tier 2 Energy Charge 14.08¢ per kWh +

Basic Charge 22.53¢ per day

# Revenue Recovery

- Optional rates will result in revenue loss.
- Revenue loss will be recovered from the Residential class through increasing all rates.

## Revenue Recovery Options

- **Option 1** – increase rates to recover maximum forecast revenue loss

Increase all Residential rates at the launch of new rates to recover maximum revenue loss assuming all customers select bill minimizing options.

- **Option 2** – recover revenue loss based on initial forecast with (no true-up)

Recover revenue loss based on initial forecast participation over a period of time (e.g., 3 or 5 years) by gradually increasing all Residential rates.

- **Option 3** – recover revenue loss based on actual participation (with true-up)

Recover revenue loss based on actual participation and revenue loss with a true-up mechanism, e.g., a rate rider or reprice based on true-ups.

# Illustrative Bill Impact Analysis

- Based on Flat Rate (12.21¢ per kWh) and Peak Charge Rate (>4 kWh \$6.59 per kWh)
- Includes a revenue recovery rate adjustment of 2.11%

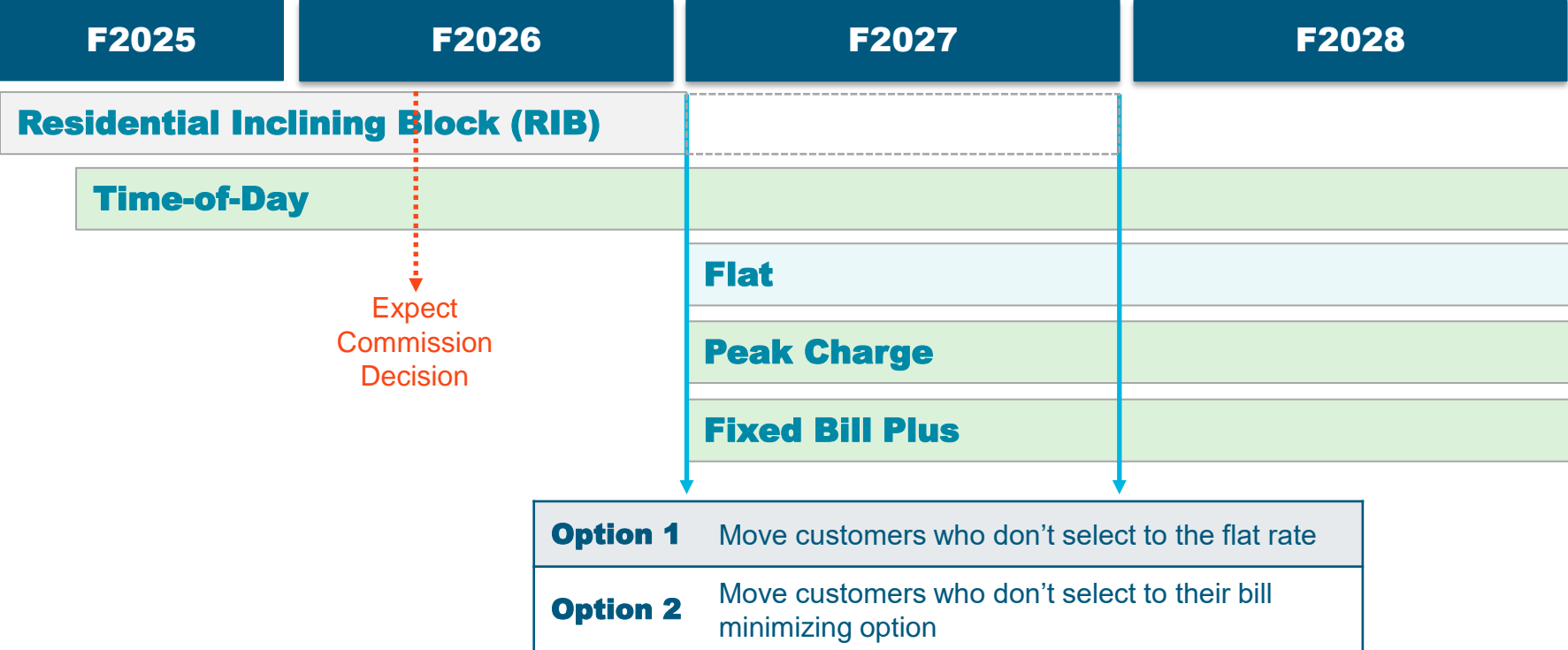
Heating Source	Dwelling Type	% of Customers	Choice of Flat OR Peak Charge			
			Average Bill Impact		Worst Impacted Customer (95 <sup>th</sup> percentile)	
			%	\$ Monthly	%	\$ Monthly
Electric heating	Single detached	15.7	-3.0	-5.67	3.4	6.33
	Row/townhome	5.7	0.6	0.75	5.9	7.17
	Apartment	19.0	2.9	1.67	9.6	5.58
	Other	1.3	-3.2	-4.92	4.0	6.25
Non-electric heating	Single detached	41.0	0.6	0.67	6.8	7.92
	Row/townhome	4.5	4.0	2.92	11.0	7.92
	Apartment	9.2	4.7	1.67	9.3	3.33
	Other	3.6	-0.2	-0.17	7.3	7.83

# Illustrative Bill Impact Analysis

- Based on Flat Rate (12.21¢ per kWh) and Peak Charge Rate (>4 kWh \$6.59 per kWh)
- Includes a revenue recovery rate adjustment of 2.11%

Consumption Annual kWh	Average monthly bill \$	% of customers	Choice of Flat OR Peak Charge	
			Average bill impact	
			%	\$ Monthly
0 - 4,000	30	20.9	5.6	2
4,001 - 8,000	62	28.8	5.7	4
8,001 - 12,000	103	21.2	3.1	3
12,001 - 16,000	149	13.1	-0.2	0
16,001 - 20,000	195	7.3	-2.4	-5
20,001 - 30,000	265	6.6	-4.5	-12
30,001 - 50,000	409	1.8	-6.9	-28
>50,000	1,042	0.4	-9.8	-102

# Illustrative Transition & Implementation



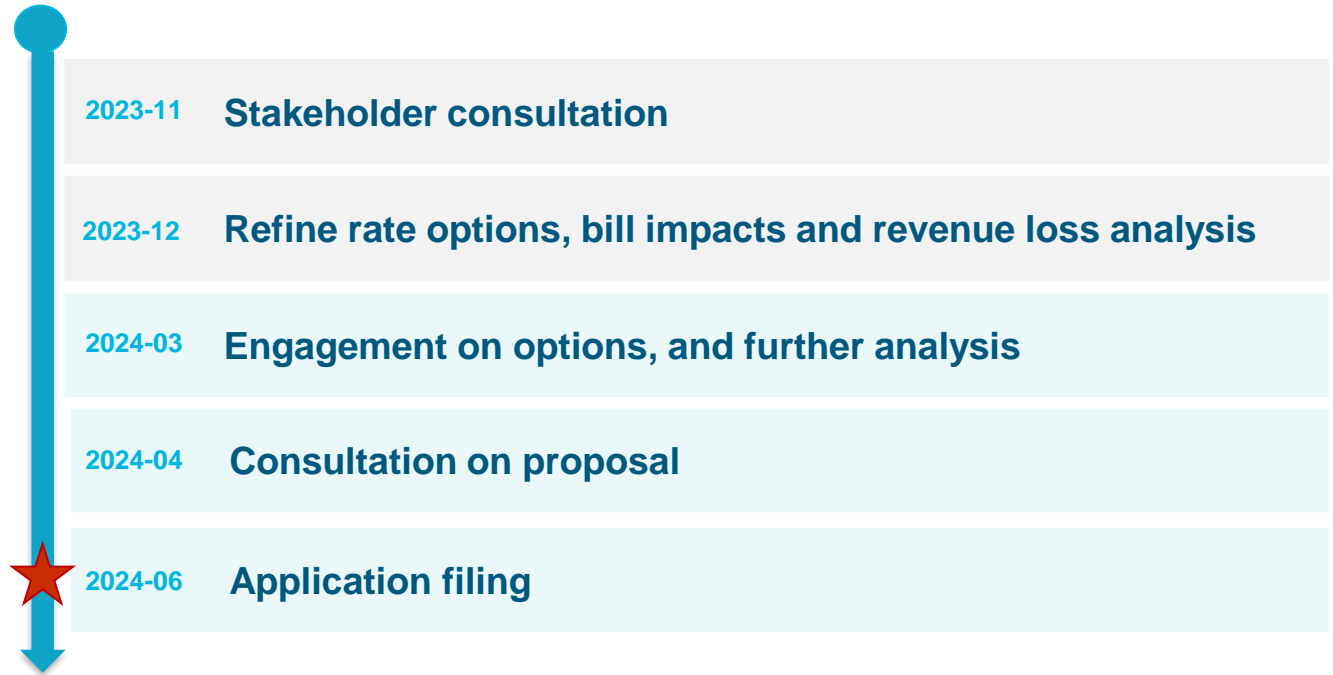
# Next Steps

**Chris Sandve**

**Chief Regulatory Officer**



# Next Steps



# Closing Remarks

- BC Hydro values your participation and feedback on our rate design
- Please contact BC Hydro Regulatory Group with any questions about the regulatory or engagement process at [bchydroregulatoryfeedback@bchydro.com](mailto:bchydroregulatoryfeedback@bchydro.com)
- An email will be sent early next week providing a link to the online feedback form



**BC Hydro**

Power smart