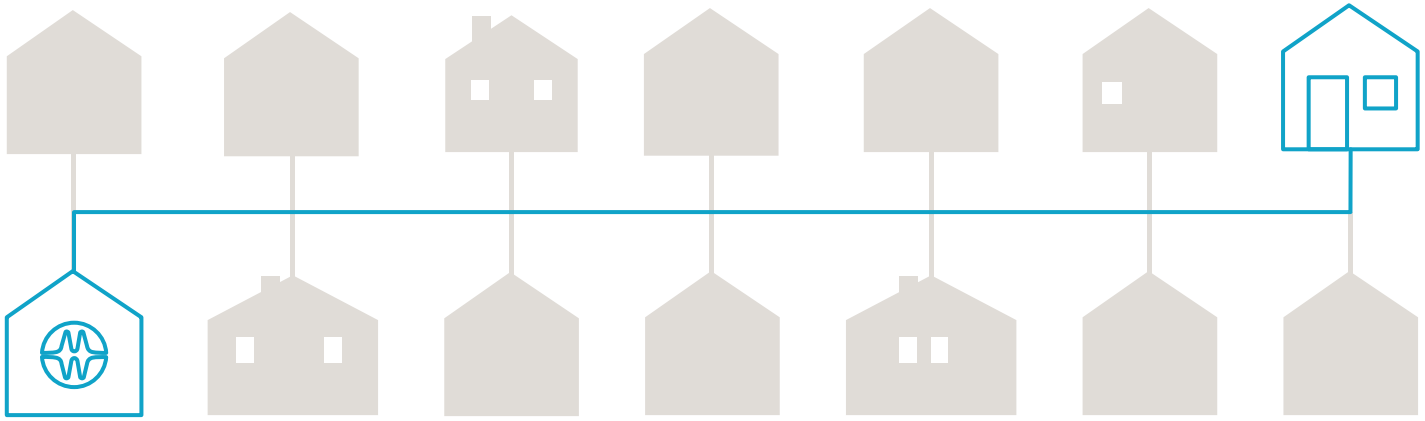
Large General Service Voluntary Time of Use (TOU) Rate Options

Prepared for meeting with CEC

January 5, 2017



BC Hydro
Power smart

Background

- BC Hydro met with Commercial Energy Consumers (CEC) on November 8, 2016.
    - BC Hydro will provide more detail around potential rate options including a curtailment program (16, 8 and 4 hour) and voluntary TOU rate in a meeting in December.
- BC Hydro met with and large general service (LGS) rate customer Dewdney Area Improvement District (DAID) and CEC on November 15, 2016
    - BC Hydro will meet with CEC and present more detail around potential rate options including a voluntary TOU rate and changing the LGS rate billing demand definition.

BC Hydro
Power smart

Outline

1. Discuss changing the LGS rate billing demand definition
2. Examine voluntary LGS TOU rate options

LGS rate billing demand

1. The LGS rate (RS 16xx) billing demand is defined as the highest kW demand in the billing period.
    - Rolling 15 minute average
2. The monthly minimum charge in the LGS rate is defined as

    "50% of the highest maximum Demand Charge billed in any Billing Period wholly within an on-peak period during the immediately preceding eleven Billing Periods. For the purpose of this provision an on-peak period commences on 1 November in any year and terminates on 31 March of the following year."
3. Seasonal low load factor customers such as DAID indicate that the LGS demand ratchet is unfair and can lead to large bill impacts.

LGS rate billing demand

- Billing demand in RS 1823 is defined to include the highest kV.A demand during the High Load Hours (HLH) in the billing period. The HLH period is defined as the hours from 06:00 to 22:00 Monday to Saturday, except for BC Statutory Holidays.
- Some of the advantages cited in 2005 Transmission Service Outstanding Matters application include:
    - fair allocation of demand related costs within the transmission class since customers who peak in the HLH will contribute more in demand charges than customers who peak in the LLH period
    - provides price signal to shift peak demand to LLH
    - aligns demand charges between RS 1823 and RS 1825 (Transmission Service TOU rate)

LGS rate billing demand

The following issues needs to be explored further by BC Hydro regarding changing the LGS billing demand definition:

1. Metering, billing and rate administration
2. Revenue impact
3. Customers that would benefit from this opportunity
4. Optional versus mandatory

For now, BC Hydro has included this as a possible rate option on a mandatory basis under the default rate or under an optional TOU rate.

Voluntary TOU Rate Option

Voluntary TOU rate can provide general service customers with:

- rate choice
- more control over their electricity costs
- savings on their electricity bill by encouraging participants to reduce consumption during peak periods and/or to shift load from the peak periods to the off-peak periods

BC Hydro Needs
System Capacity Need and Characteristics

- BC Hydro has sufficient planned capacity resources until F2029
- Load Resource Balance uncertainties: Advancing Rev 6 as default, but also exploring other clean capacity options (e.g. load curtailment), particularly given 100% Clean Policy
- Currently load curtailment pilot to understand whether capacity (or savings) can be relied upon to defer incremental long term generation capacity resources.
- Minimum capacity characteristics to defer generation:
    - 16 hours/day, 6 days/week (Mon to Sat), three periods of 2 consecutive weeks anytime October through April (totaling 576 hours)
    - Operationally, BC Hydro should have the flexibility to call on these 36 days of interruptions (up to 16 hrs/d) anytime October through April

BC Hydro
Power smart

BC Hydro Needs

1. BC Hydro's marginal cost of energy and capacity varies by season and time of day
    - System is winter peaking – drives T&D infrastructure needs
    - Freshet period has energy surplus
2. Load Management supported by 2013 IRP

Principles for Voluntary TOU Rate Design

- Encourage economic efficiency - by using prices that reflect marginal costs
- Minimize impacts on non-participants - by using a rate design that is revenue neutral and collects the revenue requirement
- Simple for customers to understand and practical for BC Hydro to administer
- Fairness - select a rate design avoids windfall gains to some and losses to others

Voluntary TOU Rate Design Approaches

One Part TOU Rate Structure

Basic Charge – fixed dollar charge per month which covers customer related costs for large general service

Time of use energy rates – vary by time of day e.g., peak and off-peak periods

Demand Charge - $/kW charge applied to billing demand

Bill components =

Basic charge +

(TOU Peak Energy Rate x Peak kWh) +

(TOU Off-peak Energy Rate x Off-peak kWh) +

Demand Charge x Billing Demand

One Part Rate Structure

TOU rates set so that the revenue collected under the average customer class load profile and consumption level would be equal to the revenue collected under the default rate.

Advantages:

- Easy to understand and implement

Disadvantages:

- Windfall gains (bill decreases) and losses (bill increases) without change in consumption pattern

Voluntary TOU Rate Design Approaches

Two Part TOU Rate Structure

Program Charge – covers incremental cost of administering program

Time of use energy rates – vary by time of day e.g., peak and off-peak periods

A Balancing Amount – the revenue difference between billing the historical consumption under RS16xx and the proposed TOU rate using an assigned load profile. Includes demand charge applied to historical kW load.

Bill components =

Program charge +

Balancing amount (also called delivery charge) +

(TOU Peak Energy Rate x Peak kWh) +

(TOU Off-peak Energy Rate x Off-peak kWh)

Two Part TOU Rate Structure

Maintains customer revenue neutrality (in addition to class revenue neutrality) through the use of a balancing amount.

Advantages

- Customer is billed the same amount as if they were on the standard rate unless they change their energy consumption in response to TOU prices e.g., by shifting load to the off-peak period
- Customers that make similar behavioural responses on the TOU rate are treated equally by receiving the same benefit

Disadvantages

- More effort to implement in terms of billing, communication and customer recruitment.

Rate Design Options

1. Examine impact of changing billing demand to be defined in the HLH only in default LGS and MGS rates (like in RS 1823)
    - BC Hydro to estimate revenue implications and to explore metering and billing issues

2. Examine customer impact of a voluntary TOU rate. Options include:

    2a One part TOU rate with billing demand defined only in the HLH

    2b Two part TOU rate with balancing amount, TOU energy prices.
    - demand charge does not apply to incremental load growth
    - demand charge applied to historical kW load included in balancing amount

Voluntary TOU Rate Design Option

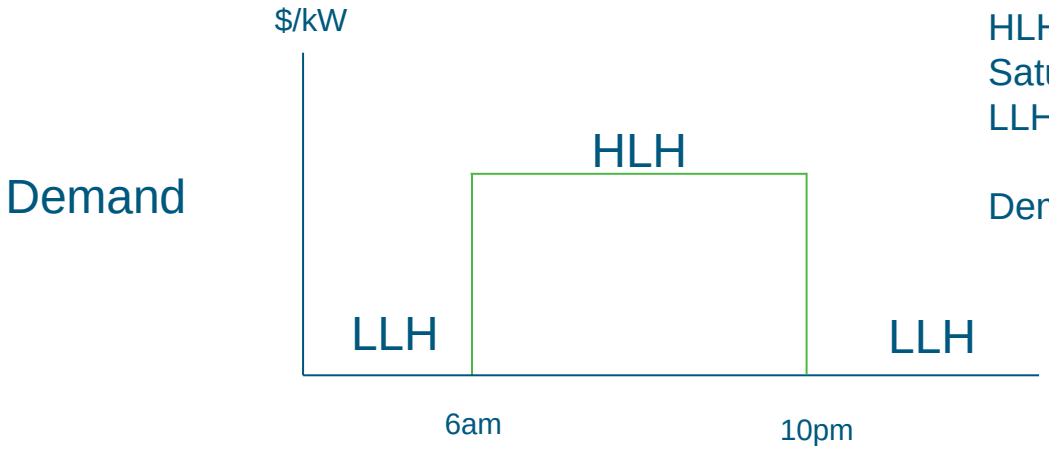
2a One Part TOU Rate

Methodology

- Use average class load shape to determine revenue neutral TOU energy rates.
- Set winter peak price higher (e.g., 2:1 ratio relative to default flat rate).
  - Reflects marginal G,T&D cost.
  - Moderate price level chosen to reduce revenue loss risk
- Set winter off-peak price to be revenue neutral
- Freshet period (May-July) has lower rate to encourage incremental consumption
- All remaining months, price same as default flat rate
- Billing demand defined in HLH to provide customer demand flexibility

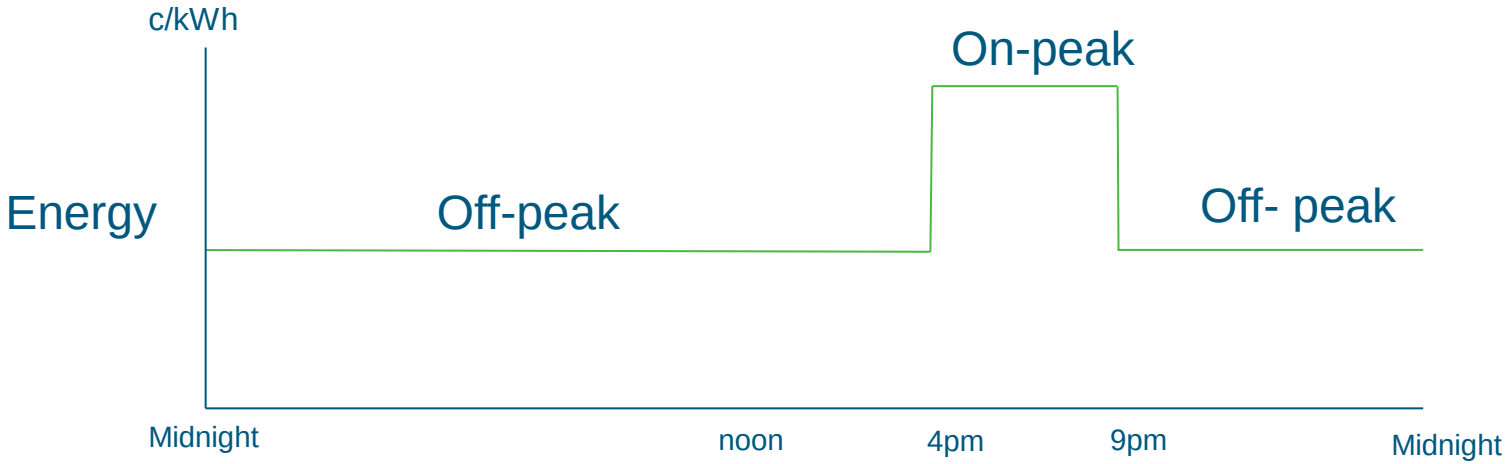
Voluntary TOU Rate Design Option

2a One Part TOU Rate



HLH = 0600 to 2200 Weekdays and Saturdays excluding BC Statutory holidays
LLH = all other times

Demand charged based on HLH only



Peak period – Winter (Nov-Feb) weekdays 4pm-9pm, excluding BC statutory holiday weekdays
Winter off-peak period – All other winter non-peak hours

BC Hydro Power smart

Voluntary TOU Rate Design Option

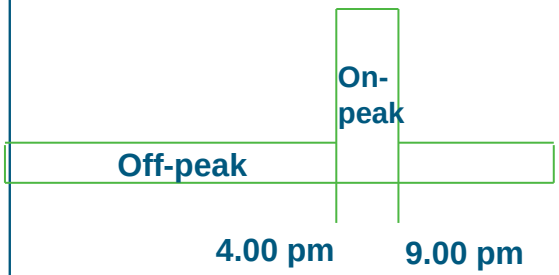
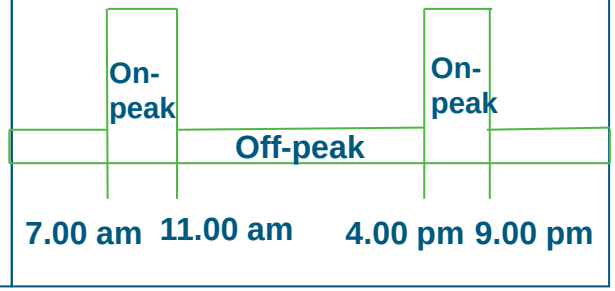
2a Two Part TOU Rate

- Winter peak prices based on marginal cost
  - Generation capacity marginal cost
  - T&D capacity marginal cost
- TOU energy cost component based on shaping the flat LGS energy rate by the long-term Mid-C price shape by season
- Winter TOU price options
  - Standard and high peak prices chosen for simplicity
    - reflect estimated marginal cost
  - 5 and 9 hour peak period options
  - Peak to off-peak price ratios vary by option
  - Off-peak price chosen to be lower than default flat energy rate. Provides incentive for customer:
    - To shift load from peak to off-peak period
    - To grow load in the off-peak period

Voluntary TOU Rate Design Option

2a Two Part TOU Rate

Standard Peak Price

5 Hour On-Peak Window Nov. - Feb., weekdays, (excluding BC stat holidays) 4:00 pm – 9:00 pm Off-Peak: all other hours	**A** 5 Hour On-Peak Window 
9 Hour On-Peak Window Nov. - Feb., weekdays (excluding BC stat holidays) 6:00 am – 10:00 am AND 4:00 pm – 9:00 pm Off-Peak: all other hours	**B** 9 Hour On-Peak Window 

Customers with unrestricted growth

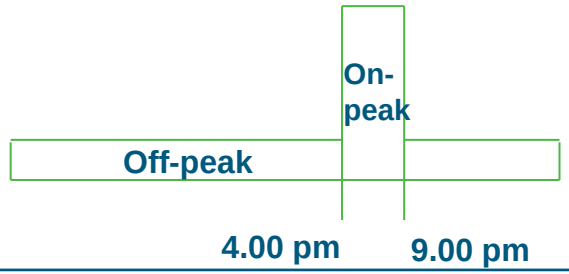
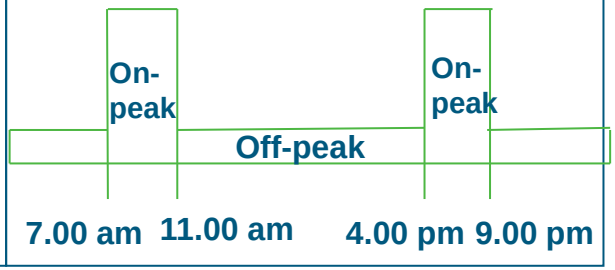
Customers with controlled growth

BC Hydro Power smart

Voluntary TOU Rate Design Option

2a Two Part TOU Rate

High Peak Price

5 Hour On-Peak Window Nov. - Feb., weekdays, (excluding BC stat holidays) 4:00 pm – 9:00 pm Off-Peak: all other hours	**C** 5 Hour On-Peak Window 
9 Hour On-Peak Window Nov. - Feb., weekdays (excluding BC stat holidays) 6:00 am – 10:00 am AND 4:00 pm – 9:00 pm Off-Peak: all other hours	**D** 9 Hour On-Peak Window 

Customers with load-shifting strategies

Customers with load reduction/ conservation strategies

BC Hydro Power smart

BC Hydro Voluntary TOU Pilot Experience

2a Two Part TOU Rate

- BC Hydro offered a voluntary TOU pilot to GS accounts >35 kW from March 2000 to October 2001.
- Approximately 500 accounts subscribed to the TOU rate.
- Adopted the same two part rate structure described above, but TOU prices were market based. Four rate options were offered which varied the TOU prices and peak period length (4 and 8 hours).
- Incremental consumption was demand charge free
- Support letters for application were provided by BOMA, United Flower Growers, BC Horticultural Coalition

Next Steps

- BC Hydro to confirm voluntary TOU pricing and undertake bill impact and revenue analysis
- CEC to follow-up with DAID and other customer groups to determine interest in voluntary TOU rate options
- BC Hydro to discuss general service voluntary TOU options at intervener workshop in February, 2017
- BC Hydro to explore metering and billing issues in more detail to implement general service voluntary TOU rates