2015 RATE DESIGN APPLICATION (RDA)
RDA WORKSHOP 11A

- SEGMENTATION
- SMALL GENERAL SERVICE (SGS) AND MEDIUM GENERAL SERVICE (MGS) RATE STRUCTURES

BC hydro
FOR GENERATIONS

June 25, 2015

WORKSHOP 11A AGENDA – JUNE 25

1. **Overview**
   - MGS and LGS Regulatory History
   - Summary of Engagement to Date and Summary of Issues
   - Jurisdictional Review
   - Roadmap for General Service (GS) Rate Alternatives Discussion

2. **Segmentation**
   - Regulatory History
   - Stakeholder Feedback and BC Hydro Consideration
   - Jurisdictional Review
   - Cost of Service (COS) Analysis
   - Principles
   - Conclusions, Next Steps

3. **SGS**
   - Regulatory History
   - Summary of Rate Structure
   - Stakeholder Feedback and BC Hydro Consideration
   - BC Hydro Preferred Rate Structure
   - Basic Charge Cost Recovery

4. **MGS**
   - Summary of Rate Structures
   - Stakeholder Feedback and BC Hydro Consideration
   - BC Hydro Preferred Energy Rate Structure
   - Demand Charge Alternatives and Cost Recovery
   - Illustrative Transition Options
   - Conclusion

WORKSHOP 11A PURPOSE

Segmentation

- To review results of BC Hydro's GS segmentation analysis to date and solicit feedback

SGS

- To identify BC Hydro's preferred SGS rate structure – Status Quo (SQ) SGS flat energy rate, basic charge, no demand charge
- To solicit additional feedback on whether BC Hydro should increase SGS basic charge cost recovery to match that of Residential Inclining Block (RIB) rate basic charge

MGS

- To identify BC Hydro's preferred MGS energy rate structure – flat energy charge
- To solicit additional feedback on three demand charge structure alternatives
- To solicit feedback on increasing MGS demand charge cost recovery
- To solicit feedback on two alternative MGS rate transition strategies from SQ MGS to MGS flat energy charge

WORKSHOP 11A

1. OVERVIEW

1. MGS and LGS Regulatory History
2. Summary of Engagement to Date and Summary of Issues
3. Jurisdictional Review
4. Roadmap for GS Alternatives Discussion

LGS & MGS

LGS Prior to 2007 RDA

- A basic charge, a declining 2 tier energy charge (threshold = 14,800 kilowatt hour (kWh) per month) in place since 1996 and an inclining 3 tier demand charge in place since 1980

2007 RDA Decision Direction 19 - BC Hydro to develop rate for existing LGS class that would:

- Encourage conservation
- Not unduly harm or benefit its customers

- A two-part baseline energy rate ("baseline") approach is the only conservation rate structure that could alleviate bill impact issue

2009 LGS Application

- BC Hydro proposed a two part baseline energy rate for LGS customers:
  - Emphasized novelty of introducing GS baseline rate – first and only in North America
  - A two-part baseline rate design is complicated, making it more suitable for larger customers
- BC Hydro proposed a flat energy rate for the MGS rate class

LGS & MGS IMPLEMENTATION

- **2010 Negotiated Settlement Agreement (NSA)**
  - Two part energy rates (baseline) for both LGS and MGS
  - The use of baselines led to the following provisions:
    - Anomaly rule: up to four Historic Baselines (HBLs) adjusted per year
    - Growth adjustment (formulaic)
    - Application for prospective growth adjustment (Tariff Supplement (TS) 82)
    - Application for exemption
    - New accounts pricing (15% at energy Long-run Marginal Cost (LRMC))
  - Approved by British Columbia Utilities Commission (BCUC) Order G-110-10 on June 29, 2010

- LGS transitioned to new rate in one group on 1 January 2011
- MGS divided into two groups for purposes of transitioning - All MGS customers transitioned to new rate by 1 April 2013

REVIEW AND ENGAGEMENT TO DATE

- **Evaluation Report #1:** 2011/2012, LGS and MGS - filed with BCUC on 30 December 2013
- **Evaluation Report #1:** Three Year Report - filed with BCUC at same time as Evaluation Report #1
- **Evaluation Report #2:** F2014, LGS and MGS
- **RDA Workshop 1:** Introduction to and scope of 2015 RDA, 8 May 2014
- **RDA Workshop 8A:** GS Workshop 1, Session 1, 21 January 2015
- **RDA Workshop 8B:** GS Workshop 1, Session 2, 11 February 2015
- **Customer Session:** Building Owners and Managers Association of BC, 7 May 2015
- **Customer Session:** BC Food Processors Association, Canadian Manufacturers and Exporters, individual MGS/LGS customers, 22 May 2015
- **Meetings with Commercial Energy Consumers Association of British Columbia:** GS rate options
- **Workshop 8A/8B Consideration Memo:** BC Hydro summary and consideration of feedback to date, 19 June 2015

SUMMARY OF ISSUES

SGS

- **No rate structure issues identified to date**
- Consideration of increasing SGS basic charge to level of RIB rate basic charge

LGS and MGS

- **Rates not performing as expected:**
  1. **Complexity**
     - Customers have difficulty understanding the rate structures
     - Complex rate structures make budgeting/estimating savings difficult for customers
     - Perceived as inhibiting growth
  2. **Limited Conservation**
     - Result of two evaluation reports; Evaluation Report #2 found:
       - No statistically significant conservation from MGS rate at both 85% and 90% confidence levels, versus forecast of about 100 gigawatt hours per year (GWh/year)
       - LGS evaluated savings in F2014 were 77 GWh/year at 85% confidence level, versus forecast of about 800 GWh/year

- **BC Hydro forecasting zero conservation for both MGS and LGS rates for planning purposes**

JURISDICTIONAL REVIEW

Default GS energy charges

- BC Hydro only Canadian utility with default baseline rates for GS customers
- Most common is flat or declining energy charge
- Inclining block energy charges for GS customers are uncommon – all are in Ontario and are being phased out as mandatory Time of Use rates are implemented

Default GS demand charges

- BC Hydro only Canadian utility with 3 tier inclining block demand charge
- Most common is a flat or 2 step demand charge; 2 step have no charge for initial small block of demand

Optional GS Rates

- Examples include interruptible rates – to be discussed on 26 June 2015
- Will be reviewed further as part of RDA Module 2, after default GS rates determined

Refer to Appendix or GS Consideration Memo, Attachment 5 for more detailed summary:

1. Default GS Energy and Demand Charges June 2015 – Canada
2. GS customer rate options – June 2015 – Canada

ROADMAP FOR GS ALTERNATIVES DISCUSSION

1. **SGS (25 June 2015): BC Hydro identifies SGS SQ structure as preferred**
   - Modelled increasing basic charge cost recovery

2. **MGS (25 June 2015): BC Hydro identifies flat energy rate (no baseline) as preferred energy rate structure, but has not identified preferred demand charge structure**
   - Demand Charge Alternatives
     1. SQ Inclining 3 Step
     2. Flat Demand Charge
     3. Two Step Demand Charge (zero first step)
   - Modelled increasing demand charge cost recovery

3. **LGS (26 June 2015): BC Hydro has not identified preferred energy rate or demand charge**
   - Energy Rate Alternatives
     1. SQ LGS Energy Rate (Retain Baseline)
     2. SQ LGS Simplified Energy Rate (Retain Baseline)
     3. LGS Flat Energy Rate (No Baseline)
     4. LGS TSR-like rate
   - Demand Charge Alternatives
     1. SQ Inclining 3 Step
     2. Flat Demand Charge
     3. Two Step Demand Charge (zero first step)

WORKSHOP 11A

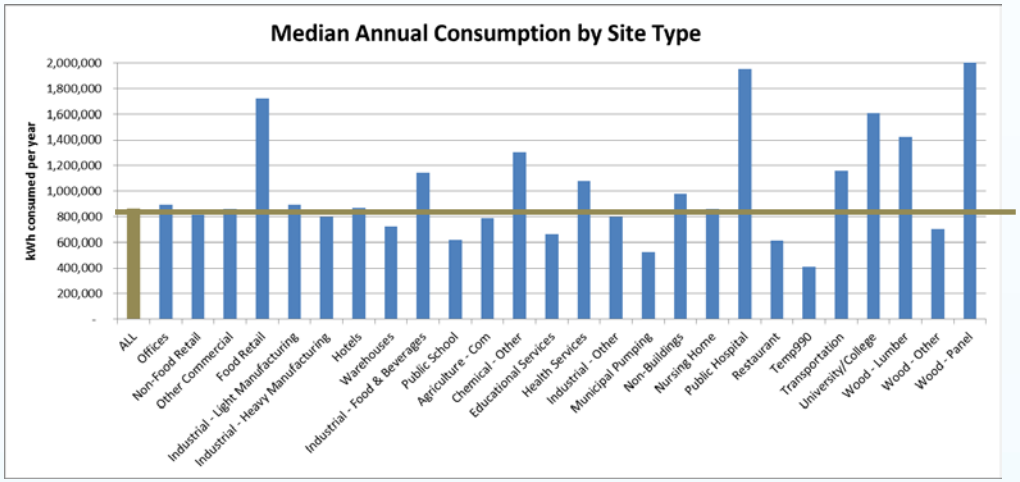
2. SEGMENTATION

1. Issue and Regulatory History
2. Stakeholder Feedback and BC Hydro Consideration
3. Jurisdictional Review
4. Cost of Service Analysis
5. Principles
6. Conclusions, Next Steps

ISSUE: HETEROGENEITY

LGS and MGS customers are diverse (heterogeneous)

- Wide range of facility types such as hospitals, sawmills, manufacturing facilities, office buildings, retail stores and common areas of multi-unit residential buildings
- Wide range of consumption and load factors
- Example: LGS customers median consumption; consumption levels vary widely by site type



Median of class

- *Refer to RDA Workshop 11 Appendix posted on RDA website for further detail*

REGULATORY HISTORY

SGS

- 35 kilowatt (kW) breakpoint in effect for over 40 years, driven in part by metering practice
- 35 kW cutoff is within range of other Canadian electric utilities

MGS/LGS

- BCUC approved LGS/MGS segmentation in 2010
  - Statistical clustering of cost data supported two potential segmentation breakpoints: 100 kW and 150 kW
  - BC Hydro chose the 150 kW breakpoint for LGS, leaving the range from 35 kW to 150 kW as MGS customers

STAKEHOLDER FEEDBACK AND CONSIDERATION

To date, no comments on SGS 35 kW breakpoint

Suggested alternatives to existing MGS and LGS rate classes:

- Single class of re-merged LGS and MGS rate classes
- New class of extra large LGS customers (e.g., 2,000 kW) under a TSR-like rate
- Examine heterogeneity of existing MGS & LGS classes to better segment similar customers

JURISDICTIONAL REVIEW
(SELECTED CANADIAN UTILITIES)

Utility	Number of GS Customers	GS Rate Class Breakpoints (kW)
BC Hydro	183,000	35, 150
FortisAlberta	59,000	75, 2000
Enmax	35,000	~20, 150
Epcor	34,000	50, 150, 5000
SaskPower	60,000	75, 2000
Manitoba Hydro	69,000	50, 200
Hydro One	119,000	50
Toronto Hydro	81,000	50, 1000, 5000
Hydro Quebec	311,000	~50, 5000
New Brunswick Power	27,000	20, 750
Newfoundland Power	22,000	10, 100, 1000

PRINCIPLES

Common criteria for determining rate classes:

COS criteria

- **Load characteristics** (coincidence factor, load factor, average demand, energy use)
- **Physical characteristics** (voltage level, single phase vs. three phase, transformer ownership)
- **Rate design characteristics** (customer understanding, practicality of tariff administration)

Customer accounts should be segmented using readily observable variables that can easily be understood

- Most Canadian and U.S. jurisdictions use kW demand intervals as basis for GS class segmentation (in 2009, Energy + Environmental Economics, Inc. (E3) found 118 of 123 electric utilities use kW demand)
- Far fewer use kWh energy consumption (2009 E3 survey – 5 of 123 electric utilities)

COST OF SERVICE ANALYSIS: METHODOLOGY

BC Hydro's costs are primarily driven by three customer load characteristics, which are the focus of its analysis

Cost Category	Percent of Costs for GS Rate Classes	Allocator
Generation Energy	45.5%	kWh
Generation & Transmission Demand	30.1%	4CP
Distribution Demand	18.2%	NCP
Total for three load characteristics	93.8%	

Method 1:

- Samples of 1000 customers from each of SGS, MGS and LGS classes
- F16 forecast costs assigned to GS rate classes pooled and re-allocated pro rata by individual customer kWh, 4 Coincident Peak (CP) demand, and Non-Coincident Peak (NCP) demand

COST OF SERVICE ANALYSIS

Energy:

Cost per kWh does not vary by customer or rate class; therefore no basis for segmentation

NCP:

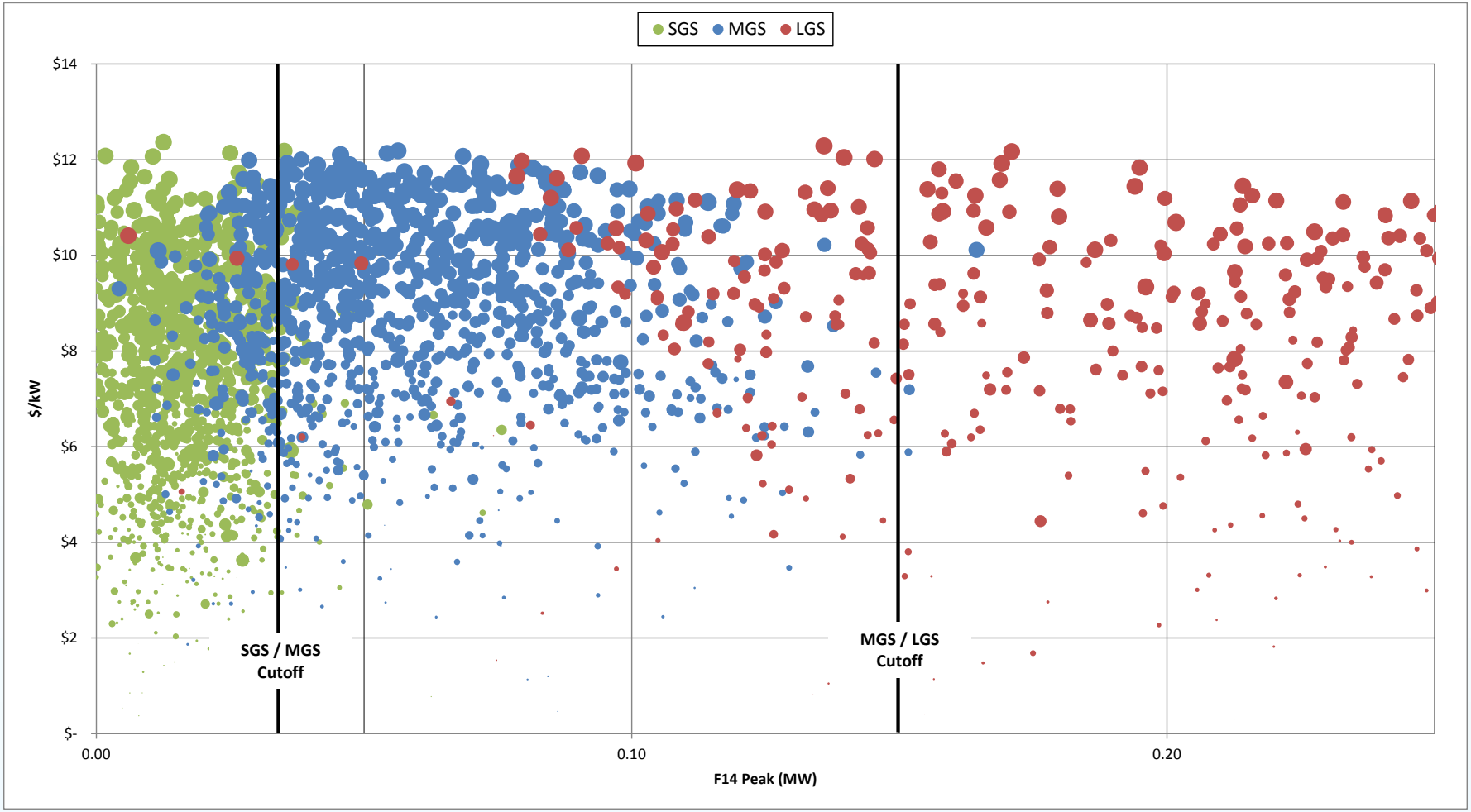
Cost per kW does not vary by rate class; therefore no basis for segmentation – NCP share could vary under different methodology

4CP:

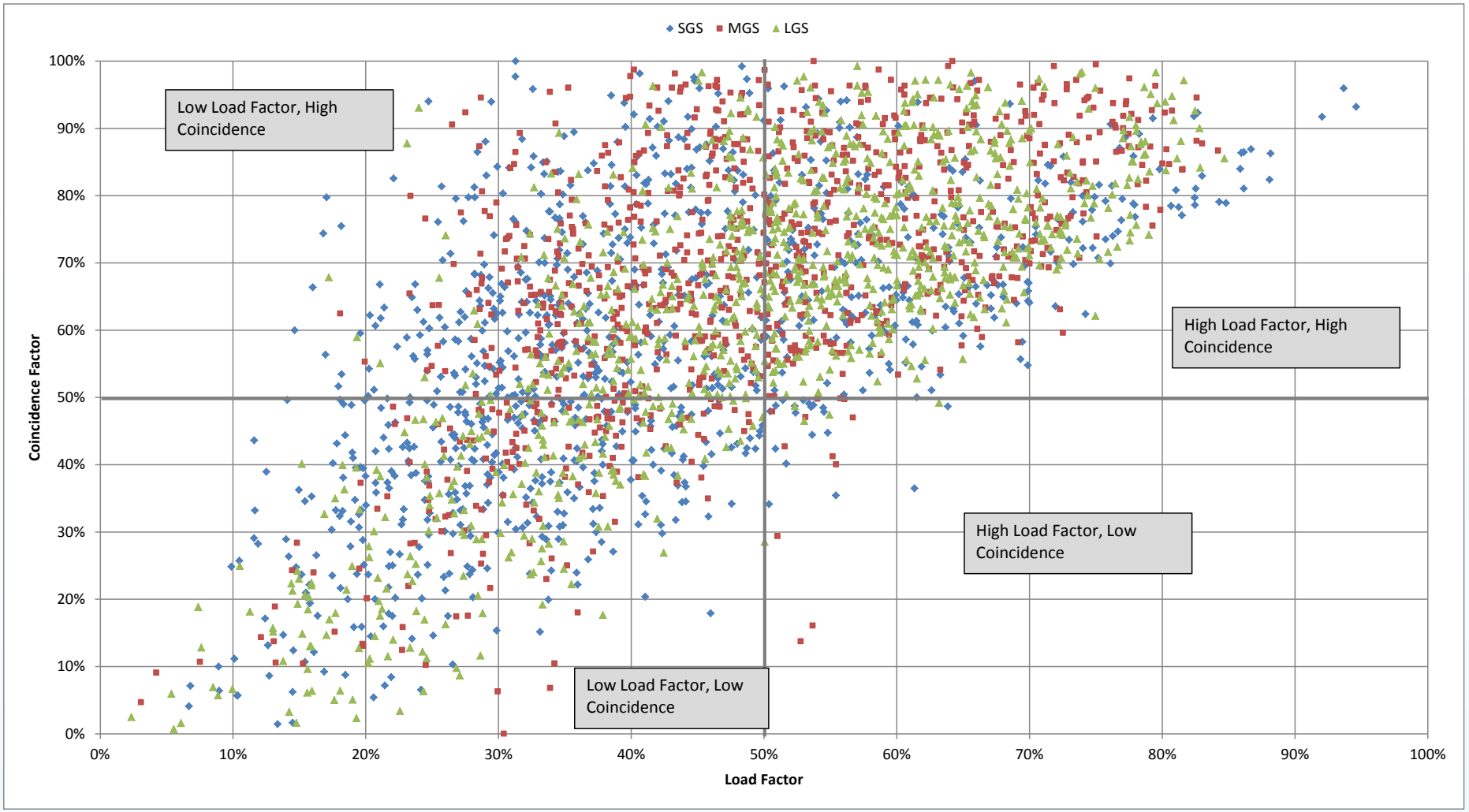
COS correlates with coincidence, not size

COST OF SERVICE ANALYSIS: 4CP COSTS

Relationship of CP Average Cost / kW and System Peak Coincidence



COST OF SERVICE ANALYSIS: LOAD FACTOR & COINCIDENCE FACTOR



CONCLUSIONS, NEXT STEPS

- Results of Method 1 not entirely conclusive
  - NCP allocation varies depending on coincidence within classes
  - Coincidence is better correlated with cost than customer size
  - Transformer cost may vary with size but cost impact is small
- Method 2 will consider cost allocation based on pre-assigned segments of customers – to be reviewed at 30 July Wrap-up Workshop
  - Main difference compared to Method 1 is customers will be grouped by size as opposed to evaluated individually; similar to approach in support of 2009 LGS Application
- Further analysis on large customers to be undertaken

WORKSHOP 11A

3. SGS

1. Regulatory History
2. Summary of Rate Structure
3. BC Hydro Preferred SGS Rate Structure
4. Basic Charge Cost Recovery

REGULATORY HISTORY

- Flat energy rate structure has been in place since 1996 (declining block energy rate in prior years)
- No substantive restructuring proposal in the 2007 RDA
- Not the subject of 2009 LGS Application

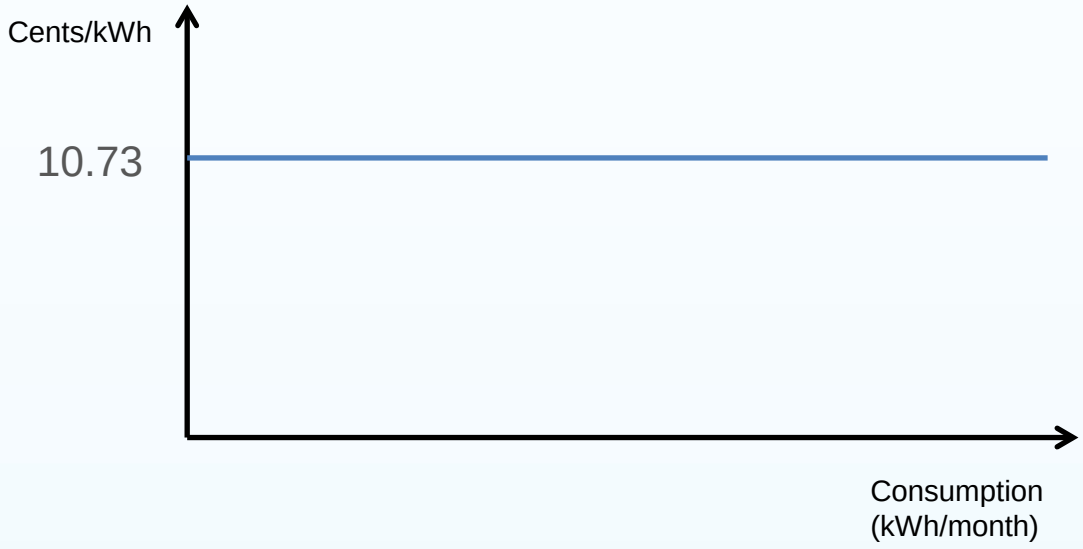
SUMMARY OF SGS RATE STRUCTURE – F2016 RATES

Basic Charge:

22.57 cents/day

- Minimum charge is equal to basic charge

Energy Charge:



BC HYDRO PREFERRED SGS RATE STRUCTURE

- **BC Hydro prefers SQ SGS rate structure**
  - Feedback: General agreement that no strong basis to depart from SQ rate structure
  - Energy rate (F16 = 10.73 cents/kWh) within range of energy LRMC (Upper end F16 = 11.01 cents/kWh)
  - No viable alternatives:
    - Inclining block not viable; heterogeneity
    - Baseline rate not appropriate for this class

- **Consider Basic Charge increases comparable to RIB rate Basic Charge cost recovery**
  - Feedback: BC Hydro to model increase in fixed cost recovery from current 35% level to 45% (comparable to RIB rate Basic Charge cost recovery)

SGS BASIC CHARGE COST RECOVERY

Rates

		Status Quo			Basic Charge at 45% CR		
SGS	**F16**	**F17**	**F18**	**F19**	**F17**	**F18**	**F19**
Basic $/day	0.2257	0.2347	0.2429	0.2502	0.3200	0.3312	0.3412
Energy c/kwh							
Flat Rate	10.73	11.16	11.55	11.89	11.01	11.39	11.73

Annual Bill Impact Analysis

Percentile by consumption	Billed Days	Annual kWh	F17 Bill Impact of Alternative	F17 SQ Bill	F17 Alternative Bill	Difference	
Min	365	1	42%	$86	$117	$31	Alt. is more expensive
10	365	2,001	13%	$309	$337	$28	
20	365	4,773	8%	$618	$642	$24	
30	365	7,797	6%	$956	$975	$19	
40	365	11,184	5%	$1,334	$1,348	$14	
50	365	15,288	4%	$1,792	$1,800	$8	
60	365	20,648	4%	$2,390	$2,390	$0	
70	365	28,435	4%	$3,259	$3,247	$12	Alt. is cheaper
80	365	40,838	3%	$4,643	$4,613	$30	
90	365	65,174	3%	$7,359	$7,292	$67	
Max	366	615,810	3%	$68,810	$67,918	$892	

Note: SQ Bill Impact is 4%

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SGS BASIC CHARGE COST RECOVERY

- The draft F2016 COS for SGS customers is driven by:
  - 38% energy
  - 50% demand
  - 12% customer

- Increasing SGS basic charge to 45% of cost recovery is closer to full fixed cost recovery

- Resulting energy rate remains within the LRMC range and without substantial bill impacts

WORKSHOP 11A

4. MGS

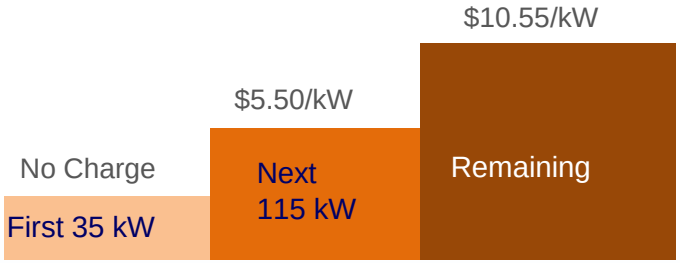
1. Summary of Rate Structures
2. BC Hydro Preferred MGS Energy Rate Structure
3. Demand Charge Alternatives and Cost Recovery
4. Illustrative Transition Options
5. Conclusion

SUMMARY OF MGS RATE STRUCTURES – F2016 RATES

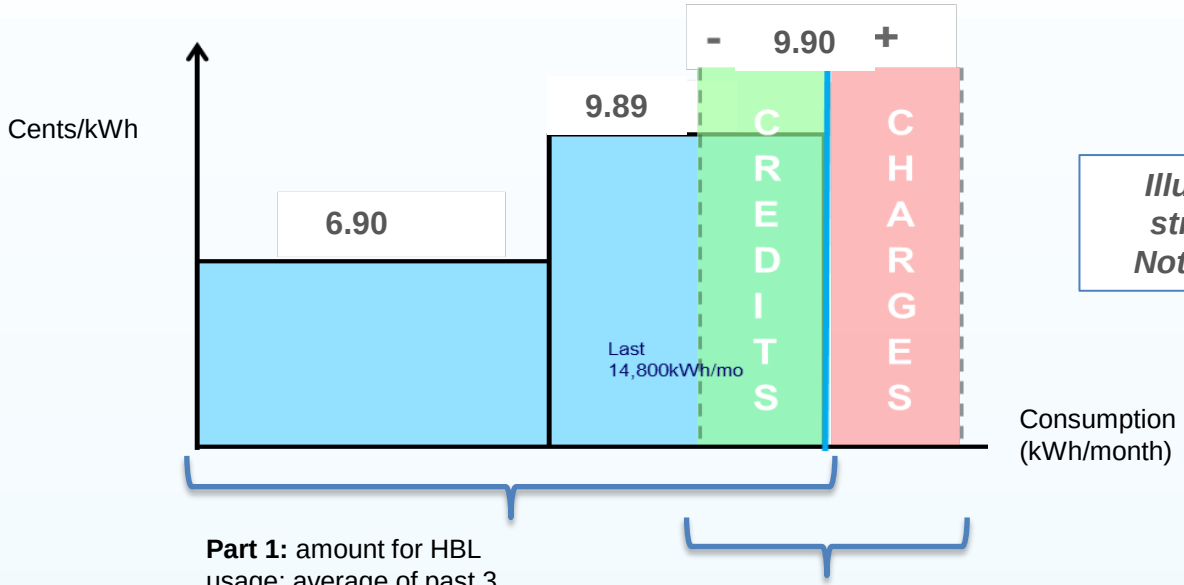
Basic Charge:

22.57 cents/day

Demand Charge:



Energy Charge:



Illustrative structure: Not to scale

Part 1: amount for HBL usage; average of past 3 years

Part 2 (for almost all bills):
Credits and charges at energy LRMC

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PREFERRED ENERGY RATE STRUCTURE + DEMAND CHARGE STRUCTURE ALTERNATIVES

Rate Structure

1. SQ MGS Rate (for comparison only)
2. **Preferred Energy Rate Alternative:** Flat Energy Rate (no baseline)
3. Demand Charge Structure Alternatives **+ Preferred Energy Rate**

   Alternative A: Flat demand Charge + Flat Energy Rate

   Alternative B: Two Step Demand Charge + Flat Energy Rate

Demand Cost Recovery

4. Increase MGS cost recovery of flat demand from ~15% (SQ) to 35%

Illustrative Transitioning Strategies to Flat Energy Rate, Flat Demand Charge

1. 3 year phase-in
2. 10% bill impact Cap

BC HYDRO PREFERRED MGS ENERGY RATE STRUCTURE

- **BC Hydro preferred energy rate structure is the Flat Energy Rate (No Baseline)**
  - Feedback: Broad agreement SQ rate structure is not a clear price signal for conservation and is poorly understood
    - Flat Energy rate could be used as base alternative to which all other MGS rate alternatives compared in terms of achieving rate structure objectives
  - Given evaluation results, no effect on rate structure conservation
  - BC Hydro carries forward the SQ MGS Energy Rate for comparison purposes only

DEMAND CHARGE STRUCTURE ALTERNATIVES & COST RECOVERY

Rate Structure

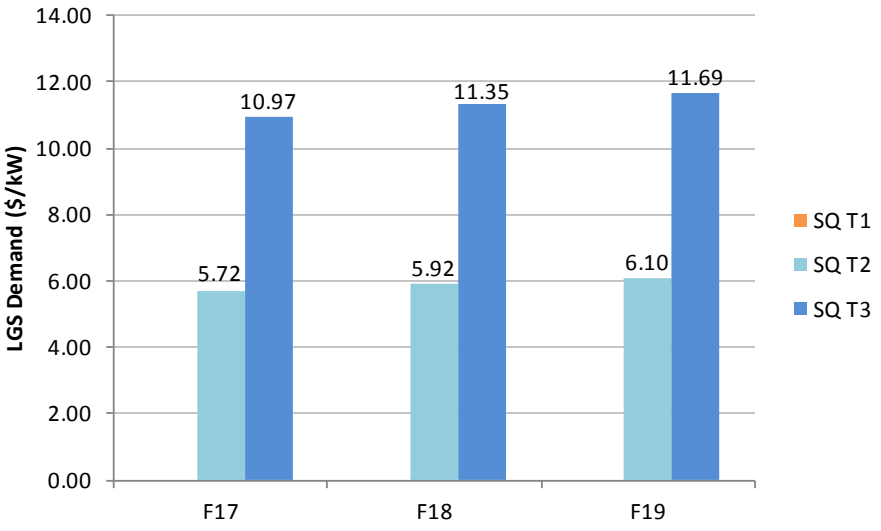
- BC Hydro has no preferred demand structure at this time; competing default structure alternatives are:
  1. SQ Demand Charge (Three Step Inclining Block)
  2. Flat Demand Charge
  3. Two Step Inclining Block Demand Charge (retaining Tier 1 = $0)
- Feedback:
  - General agreement that inclining block structure does not align with cost causation
  - Concern that changes to demand charge structure may result in large bill impacts
- Atypical design in Canada
- **Tradeoff on demand charge is cost causation and customer acceptance and understanding (bill impacts)**

DEMAND CHARGE STRUCTURE ALTERNATIVES & COST RECOVERY

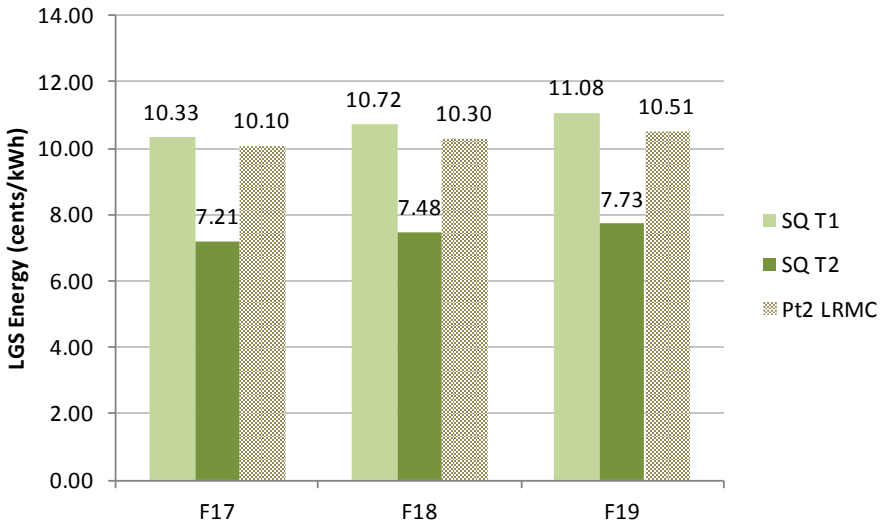
Cost Recovery

- MGS demand charges recovery about 15% of assigned fixed costs
  - Feedback: BC Hydro to model an increase in cost recovery to test rate changes and bill impacts
  - The ‘correct’ level of cost recovery cannot be targeted in isolation; more a function of multiple and sometimes competing objectives and trade-offs across all contemplated rate design changes

SQ MGS RATES



Demand Charges



Energy Charges

Illustrative Customer Bill (F2017)

Load Factor of 36%, Baseline Consumption = 153,240 kWh per year, Billed kW = 49 kW each month

Customer Scenario	Demand Charge	Energy Charge	Basic Charge	Total Bill
Consume at baseline	$961	$15,830	$86	$16,876
+ 5% from baseline	$961	$16,604	$86	$17,650
- 5% from baseline	$961	$15,056	$86	$16,102

Note: Illustrative bill computation excludes rate rider, discounts, ratchets, and other provisions

Observations:

- Demand charges increase by Revenue Requirement Application (RRA)
- Energy charges increases slightly above RRA, due to recovery of net Part-2 LRMC credits to maintain class revenue neutrality
- Energy T1 exceeds Part-2 LRMC

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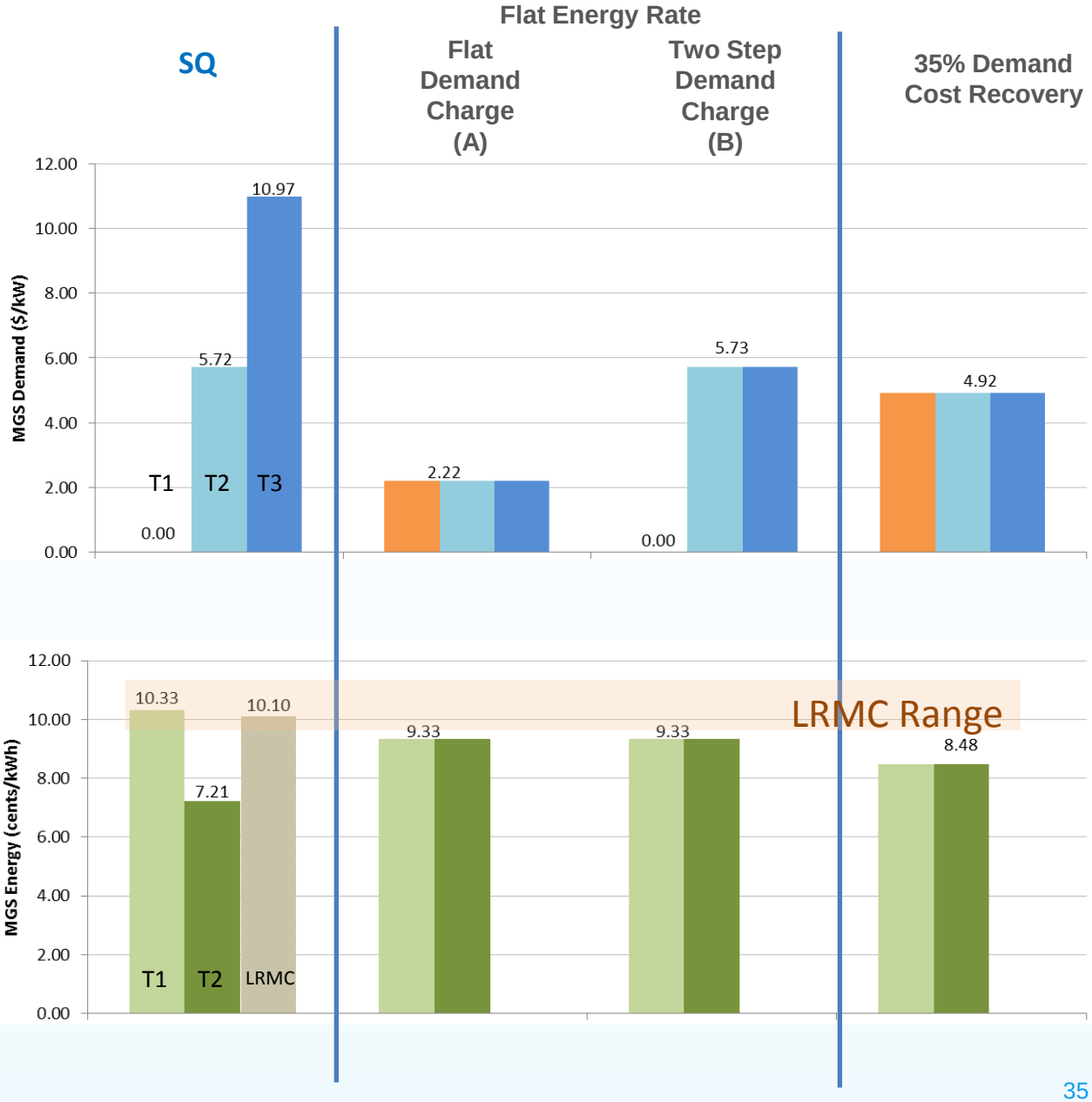
SUMMARY OF MGS RATE ALTERNATIVES F2017

Demand Charge
T1 (First 35 kW)
T2 (35 to 150 kW)
T3 (>150 kW)



Energy Charge
T1 (Pt 1 first 14800 kWh/mo)
T2 (Pt 1 >14800 kWh/mo)
Pt 2 LRMC (Credit/Charge)

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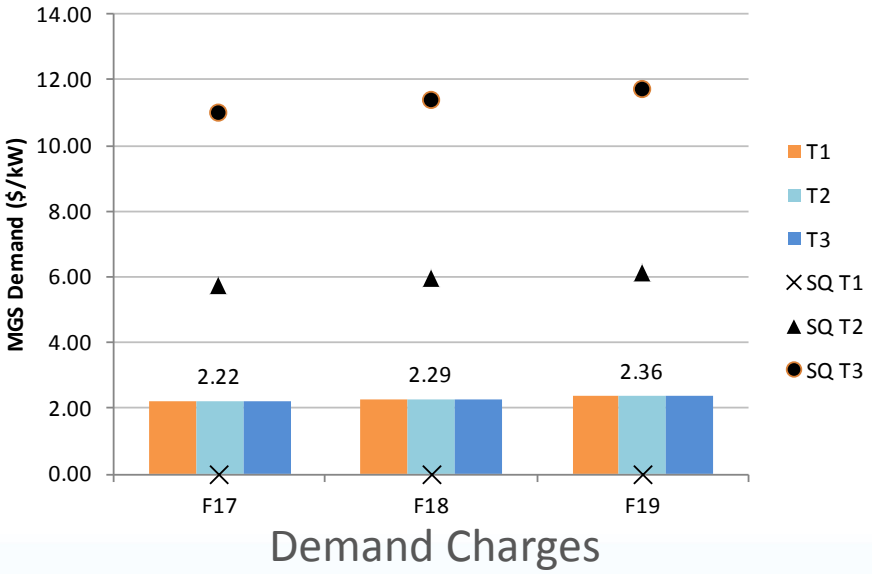
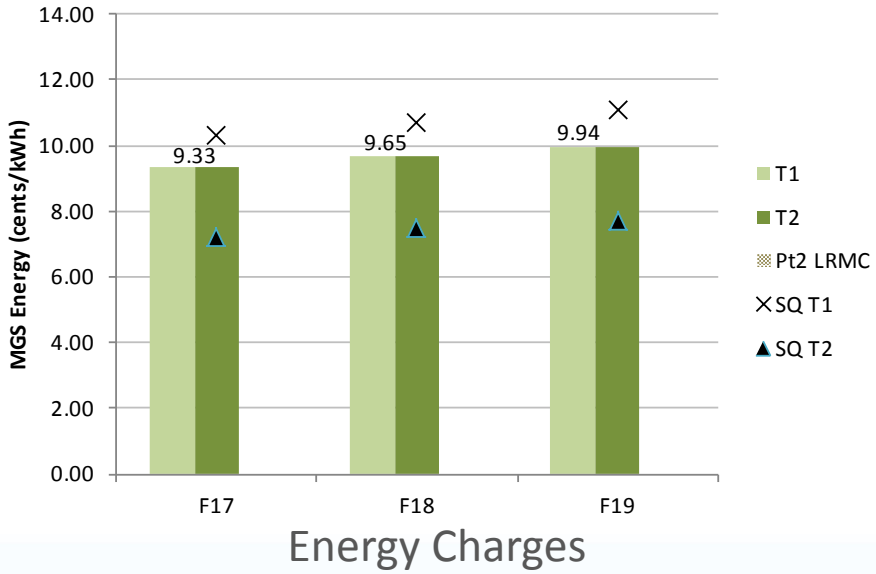
MGS ALTERNATIVE A: FLAT DEMAND CHARGE + FLAT ENERGY RATE



Demand Charges



Energy Charges

Illustrative Customer Bill (F2017)

Load Factor of 36%, Baseline Consumption = 153,240 kWh per year, Billed kW = 49 kW each month

Customer Scenario	Demand Charge	Energy Charge	Basic Charge	Total Bill	SQ Bill	Variance
Consume at baseline	$1,305	$14,297	$86	$15,688	$16,876	-$1,188 (-7%)
+ 5% from baseline	$1,305	$15,012	$86	$16,403	$17,650	-$1,247 (-7%)
- 5% from baseline	$1,305	$13,582	$86	$14,973	$16,102	-$1,129 (-7%)

Note: Illustrative bill computation excludes rate rider, discounts, ratchets, and other provisions

Observations:

- Demand charges increase by RRA
- Energy charges increase slightly above RRA

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SUMMARY OF TRADEOFFS COMPARED TO SQ

Fairness	Customer Understanding and Acceptance	
Cost Causation	**Customer Understanding**	**Bill Impacts**
• Better reflection of demand costs • More equitable distribution of fixed costs among customers of different kW sizes	• Potentially better understanding • Jurisdictional precedent for flat demand charge • No jurisdictional precedent for 3 step inclining block	• Generally, bill impacts from flattening of demand rates and energy rates offset • However, customers with high load factor, high consumption; and low load factor, low consumption experience highest adverse bill impacts

ILLUSTRATIVE SENSITIVITY ANALYSIS

F17 illustrative bill impact

Annual Consumption kWh

Highest kw

Load Factor

*	10,000	30,000	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000
10%	23.5%	24.5%	-8.7%	-16.6%	-20.1%	-26.0%	-31.1%	-32.9%	-34.2%	-35.2%	-35.9%	-36.5%	-37.0%	-37.4%	-37.8%	-38.1%	-38.4%
20%	9.3%	9.6%	9.6%	-2.1%	-7.4%	-10.4%	-12.0%	-10.2%	-8.9%	-8.6%	-10.3%	-11.6%	-12.7%	-13.6%	-14.4%	-15.0%	-15.6%
30%	4.5%	4.6%	4.6%	4.6%	-1.2%	-4.7%	-6.6%	-4.5%	-3.0%	-1.7%	-0.6%	0.2%	1.0%	1.6%	0.7%	-0.2%	-1.0%
40%	2.2%	2.1%	2.1%	2.0%	2.0%	-1.4%	-3.4%	-1.2%	0.6%	2.0%	3.1%	4.1%	4.9%	5.6%	6.2%	6.8%	7.2%
50%	0.8%	0.6%	0.5%	0.5%	0.5%	0.5%	-1.3%	1.1%	2.9%	4.4%	5.6%	6.7%	7.5%	8.3%	8.9%	9.5%	10.0%
60%	-0.2%	-0.4%	-0.5%	-0.5%	-0.5%	0.5%	-0.1%	2.6%	4.6%	6.1%	7.4%	8.5%	9.4%	10.2%	10.9%	11.5%	12.0%
70%	-0.9%	-1.1%	-1.2%	-1.2%	-1.2%	-1.2%	-0.8%	3.6%	5.8%	7.4%	8.8%	9.9%	10.8%	11.6%	12.3%	13.0%	13.5%
80%	-1.4%	-1.7%	-1.7%	-1.8%	-1.8%	-1.8%	-1.4%	3.0%	6.5%	8.4%	9.8%	10.9%	11.9%	12.7%	13.5%	14.1%	14.7%
90%	-1.8%	-2.1%	-2.2%	-2.2%	-2.2%	-2.2%	-1.8%	2.5%	6.1%	9.0%	10.6%	11.8%	12.8%	13.6%	14.4%	15.0%	15.6%

Lowest kw

Red means higher than Class Average Rate Change (CARC) of 4% for F17

F17 illustrative % bill difference after RRA is excluded

Highest kw

Load Factor

*	10,000	30,000	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000
10%	19.5%	20.5%	-12.7%	-20.6%	-24.1%	-30.0%	-35.1%	-36.9%	-38.2%	-39.2%	-39.9%	-40.5%	-41.0%	-41.4%	-41.8%	-42.1%	-42.4%
20%	5.3%	5.6%	5.6%	-6.1%	-11.4%	-14.4%	-16.0%	-14.2%	-12.9%	-12.6%	-14.3%	-15.6%	-16.7%	-17.6%	-18.4%	-19.0%	-19.6%
30%	0.5%	0.6%	0.6%	0.6%	-5.2%	-8.7%	-10.6%	-8.5%	-7.0%	-5.7%	-4.6%	-3.8%	-3.0%	-2.4%	-3.3%	-4.2%	-5.0%
40%	-1.8%	-1.9%	-1.9%	-2.0%	-2.0%	-5.4%	-7.4%	-5.2%	-3.4%	-2.0%	-0.9%	0.1%	0.9%	1.6%	2.2%	2.8%	3.2%
50%	-3.2%	-3.4%	-3.5%	-3.5%	-3.5%	-3.5%	-5.3%	-2.9%	-1.1%	0.4%	1.6%	2.7%	3.5%	4.3%	4.9%	5.5%	6.0%
60%	-4.2%	-4.4%	-4.5%	-4.5%	-4.5%	-4.5%	-4.1%	-1.4%	0.6%	2.1%	3.4%	4.5%	5.4%	6.2%	6.9%	7.5%	8.0%
70%	-4.9%	-5.1%	-5.2%	-5.2%	-5.2%	-5.2%	-4.8%	-0.4%	1.8%	3.4%	4.8%	5.9%	6.8%	7.6%	8.3%	9.0%	9.5%
80%	-5.4%	-5.7%	-5.7%	-5.8%	-5.8%	-5.8%	-5.4%	-1.0%	2.5%	4.4%	5.8%	6.9%	7.9%	8.7%	9.5%	10.1%	10.7%
90%	-5.8%	-6.1%	-6.2%	-6.2%	-6.2%	-6.2%	-5.8%	-1.5%	2.1%	5.0%	6.6%	7.8%	8.8%	9.6%	10.4%	11.0%	11.6%

Lowest kw

Red means higher than RRA

***Note: Extremely high sensitivity on low load factor, lower consumption customers.**

More intense green indicates higher bill impact
Most "typical" customers as defined by kWh and Load Factor fall approximately within the blue oval area
Major assumption: customers have the annual max kW for all months

ILLUSTRATIVE SENSITIVITY ANALYSIS

F19 illustrative bill impact

Annual Consumption kWh

Highest kw

Load Factor

*	10,000	30,000	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000
10%	31.5%	32.6%	-2.8%	-11.2%	-14.9%	-21.2%	-26.6%	-28.5%	-29.9%	-31.0%	-31.8%	-32.4%	-32.9%	-33.4%	-33.8%	-34.1%	-34.4%
20%	16.4%	16.7%	16.8%	4.3%	-1.4%	-4.6%	-6.2%	-4.4%	-3.0%	-2.6%	-4.4%	-5.9%	-7.0%	-8.0%	-8.8%	-9.5%	-10.1%
30%	11.4%	11.4%	11.4%	11.4%	5.2%	1.5%	-0.5%	1.7%	3.4%	4.7%	5.8%	6.8%	7.6%	8.2%	7.3%	6.3%	5.5%
40%	8.8%	8.7%	8.7%	8.7%	8.7%	5.1%	2.9%	5.3%	7.1%	8.6%	9.9%	10.9%	11.8%	12.5%	13.2%	13.7%	14.2%
50%	7.3%	7.1%	7.1%	7.1%	7.1%	7.1%	5.1%	7.6%	9.6%	11.2%	12.5%	13.6%	14.6%	15.4%	16.1%	16.7%	17.2%
60%	6.3%	6.1%	6.0%	6.0%	6.0%	6.0%	6.4%	9.3%	11.4%	13.1%	14.4%	15.6%	16.6%	17.4%	18.1%	18.8%	19.3%
70%	5.6%	5.3%	5.3%	5.2%	5.2%	5.2%	5.6%	10.3%	12.7%	14.5%	15.9%	17.0%	18.1%	18.9%	19.7%	20.3%	20.9%
80%	5.1%	4.8%	4.7%	4.6%	4.6%	4.6%	5.0%	9.7%	13.5%	15.5%	17.0%	18.2%	19.2%	20.1%	20.9%	21.6%	22.1%
90%	4.7%	4.3%	4.2%	4.2%	4.2%	4.2%	4.6%	9.2%	13.0%	16.1%	17.9%	19.1%	20.1%	21.1%	21.8%	22.5%	23.1%

Lowest kw

Red means higher than cumulative CARC of 10.9% for F19

F19 illustrative % bill difference after RRA is excluded

Highest kw

Load Factor

*	10,000	30,000	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000
10%	20.6%	21.7%	-13.7%	-22.1%	-25.8%	-32.1%	-37.5%	-39.4%	-40.8%	-41.8%	-42.6%	-43.3%	-43.8%	-44.3%	-44.6%	-45.0%	-45.2%
20%	5.5%	5.8%	5.9%	-6.6%	-12.3%	-15.4%	-17.1%	-15.3%	-13.9%	-13.5%	-15.3%	-16.7%	-17.9%	-18.9%	-19.7%	-20.4%	-21.0%
30%	0.5%	0.5%	0.5%	0.5%	-5.7%	-9.4%	-11.4%	-9.2%	-7.5%	-6.1%	-5.0%	-4.1%	-3.3%	-2.6%	-3.6%	-4.6%	-5.4%
40%	-2.0%	-2.1%	-2.2%	-2.2%	-2.2%	-5.8%	-8.0%	-5.6%	-3.7%	-2.2%	-1.0%	0.0%	0.9%	1.6%	2.3%	2.9%	3.4%
50%	-3.5%	-3.7%	-3.8%	-3.8%	-3.8%	-3.8%	-5.8%	-3.2%	-1.2%	0.4%	1.7%	2.8%	3.7%	4.5%	5.2%	5.8%	6.3%
60%	-4.5%	-4.8%	-4.8%	-4.9%	-4.9%	-4.9%	-4.5%	-1.5%	0.5%	2.2%	3.6%	4.7%	5.7%	6.5%	7.3%	7.9%	8.5%
70%	-5.3%	-5.5%	-5.6%	-5.6%	-5.7%	-5.7%	-5.2%	-0.5%	1.9%	3.6%	5.0%	6.2%	7.2%	8.0%	8.8%	9.5%	10.0%
80%	-5.8%	-6.1%	-6.2%	-6.2%	-6.2%	-6.2%	-5.8%	-1.2%	2.6%	4.7%	6.1%	7.3%	8.3%	9.2%	10.0%	10.7%	11.3%
90%	-6.2%	-6.6%	-6.6%	-6.7%	-6.7%	-6.7%	-6.3%	-1.6%	2.1%	5.3%	7.0%	8.2%	9.3%	10.2%	11.0%	11.7%	12.3%

Lowest kw

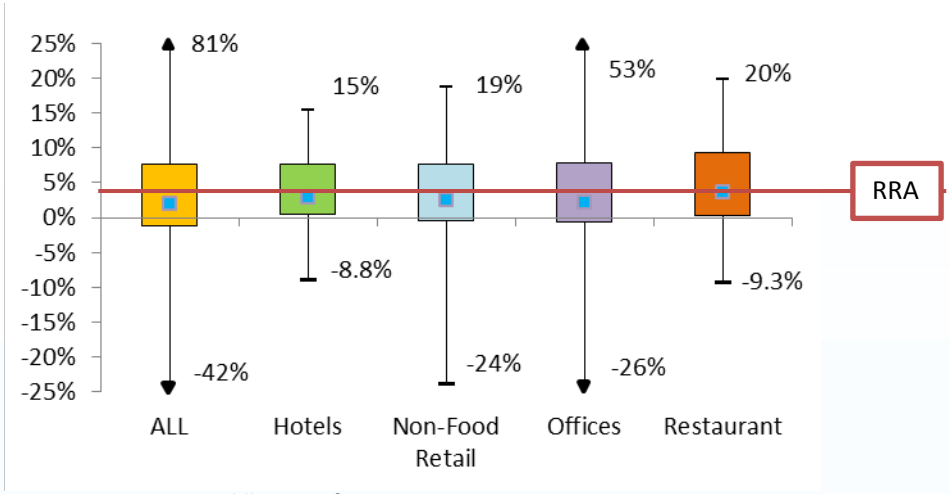
Red means higher than cumulative RRA

***Note: Extremely high sensitivity on low load factor, lower consumption customers.**

More intense green indicates higher bill impact
Most "typical" customers as defined by kWh and Load Factor fall approximately within the blue oval area
Major assumption: customers have the annual max kW for all months

% Bill difference is similar to F17, since the rate structure change is completed in one year

F2017 ILLUSTRATIVE BILL IMPACT



Boxes represent middle 60% of accounts

F17 Customer Segments	Proportion Better off than SQ	Median Bill of Segment	Median Bill Difference from SQ
All Customers	61%	$19,615	-$1,411
Hotel	58%	$19,685	$224
Non Food Retail	58%	$19,824	-$1,358
Office	59%	$19,340	-$487
Restaurant	49%	$22,939	-$706

Adverse impacts:

Low load factor, low consumption AND

High load factor, high consumption

Most adversely impacted customer:

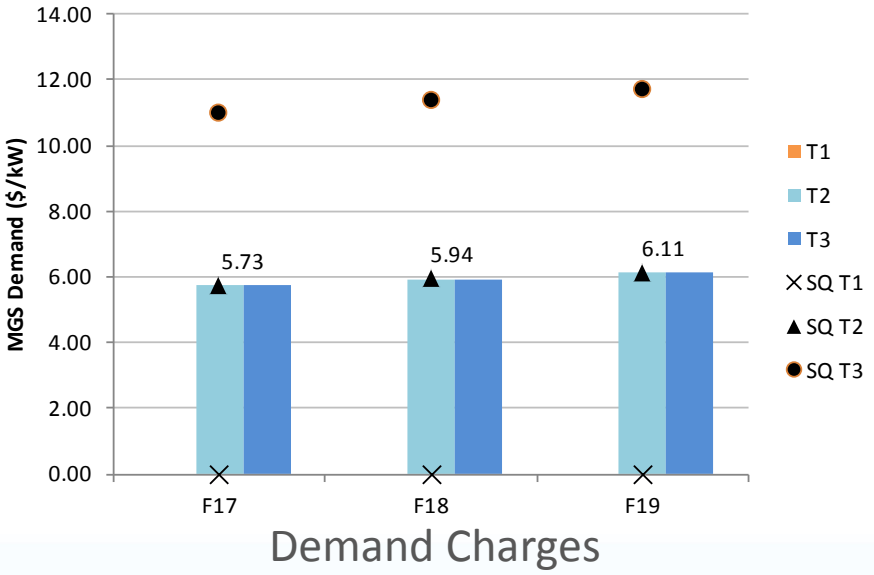
- Low load factor, low consumption
- T1 demand no longer free
- 1.0% load factor, 4 megawatt hours (MWh)/year- Wood

Most benefitted customer:

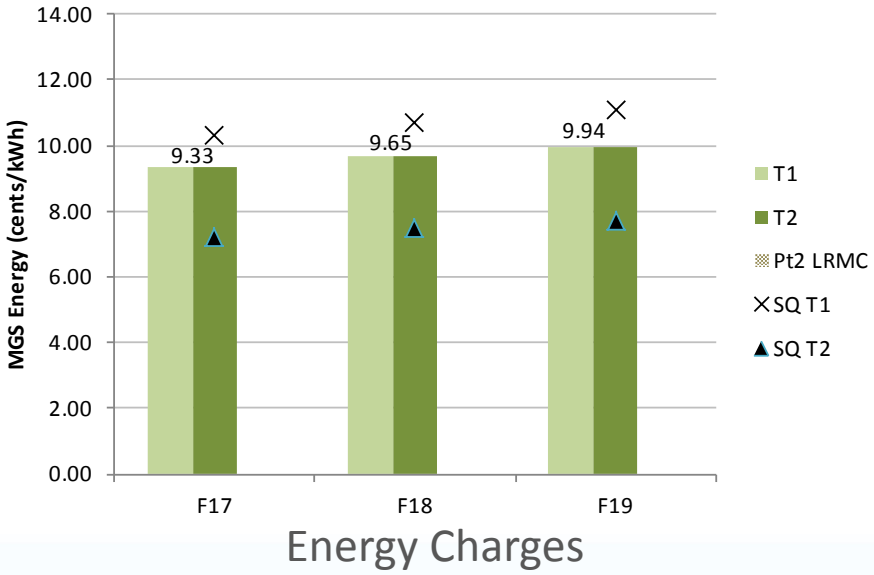
- Low load factor, medium consumption
- From substantial reduction in T3 demand charge
- 1.8% load factor, 56 MWh/year - Municipal Pumping

BC hydro
FOR GENERATIONS

MGS ALTERNATIVE B: 2 STEP DEMAND CHARGE + FLAT ENERGY RATE



Demand Charges



Energy Charges

Illustrative Customer Bill (F2017)

Load Factor of 36%, Baseline Consumption = 153,240 kWh per year, Billed kW = 49 kW each month

Customer Scenario	Demand Charge	Energy Charge	Basic Charge	Total Bill	SQ Bill	Variance
Consume at baseline	$963	$14,297	$86	$15,346	$16,876	-$1,531 (-9%)
+ 5% from baseline	$963	$15,012	$86	$16,060	$17,650	-$1,590 (-9%)
- 5% from baseline	$963	$13,582	$86	$14,631	$16,102	-$1,472 (-9%)

Note: Illustrative bill computation excludes rate rider, discounts, ratchets, and other provisions

Observations:

- Savings comes from reduced demand T1
- **Bill impacts for SQ Demand and Flat Energy are substantially similar to the results presented for this alternative because MGS customers that see T3 migrate to LGS**

SUMMARY OF TRADEOFFS COMPARED TO SQ

Fairness	Customer Service and Acceptance	
Cost Causation	**Customer Understanding**	**Bill Impacts**
• Demand charges are not substantially different than SQ, as very few MGS customers has demand charges at T3	• Potentially better understanding but flattening T2/T3 demand only could still cause confusion • Jurisdictional precedent for 2 step inclining block • No jurisdictional precedent for 3 step inclining block	• Flattening only T2/T3 results in demand pricing similar to SQ, therefore cannot offset bill impact for larger customers • Higher bill impacts for accounts with high consumption and high load factor

F17 illustrative bill impact

Annual Consumption kWh

Highest kw

Load Factor

	10,000	30,000	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000
10%	-4.9%	-5.4%	-2.9%	-2.3%	-2.1%	-6.9%	-11.8%	-13.1%	-14.0%	-14.7%	-15.2%	-15.6%	-16.0%	-16.3%	-16.5%	-16.8%	-16.9%
20%	-4.9%	-5.4%	-5.5%	-4.5%	-4.1%	-3.8%	-3.3%	0.1%	2.8%	4.2%	2.9%	2.0%	1.2%	0.6%	0.1%	-0.4%	-0.8%
30%	-4.9%	-5.4%	-5.5%	-5.6%	-5.1%	-4.7%	-4.2%	-0.4%	2.7%	5.1%	7.0%	8.7%	10.1%	11.3%	10.8%	10.1%	9.5%
40%	-4.9%	-5.4%	-5.5%	-5.6%	-5.6%	-5.3%	-4.7%	-0.6%	2.6%	5.1%	7.2%	9.0%	10.5%	11.7%	12.8%	13.8%	14.7%
50%	-4.9%	-5.4%	-5.5%	-5.6%	-5.6%	-5.6%	-5.0%	-0.8%	2.5%	5.1%	7.3%	9.2%	10.7%	12.0%	13.2%	14.2%	15.1%
60%	-4.9%	-5.4%	-5.5%	-5.6%	-5.6%	-5.6%	-5.2%	-0.9%	2.4%	5.2%	7.4%	9.3%	10.9%	12.3%	13.5%	14.5%	15.4%
70%	-4.9%	-5.4%	-5.5%	-5.6%	-5.6%	-5.6%	-5.2%	-1.0%	2.4%	5.2%	7.5%	9.4%	11.0%	12.4%	13.6%	14.7%	15.7%
80%	-4.9%	-5.4%	-5.5%	-5.6%	-5.6%	-5.6%	-5.2%	-1.0%	2.4%	5.2%	7.5%	9.5%	11.1%	12.6%	13.8%	14.9%	15.8%
90%	-4.9%	-5.4%	-5.5%	-5.6%	-5.6%	-5.6%	-5.2%	-1.0%	2.4%	5.2%	7.6%	9.5%	11.2%	12.7%	13.9%	15.0%	16.0%

Lowest kw

Red means higher than CARC of 4% for F17

F17 illustrative % bill difference after RRA is excluded

Highest kw

Load Factor

*	10,000	30,000	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000
10%	-8.9%	-9.4%	-6.9%	-6.3%	-6.1%	-10.9%	-15.8%	-17.1%	-18.0%	-18.7%	-19.2%	-19.6%	-20.0%	-20.3%	-20.5%	-20.8%	-20.9%
20%	-8.9%	-9.4%	-9.5%	-8.5%	-8.1%	-7.8%	-7.3%	-3.9%	-1.2%	0.2%	-1.1%	-2.0%	-2.8%	-3.4%	-3.9%	-4.4%	-4.8%
30%	-8.9%	-9.4%	-9.5%	-9.6%	-9.1%	-8.7%	-8.2%	-4.4%	-1.3%	1.1%	3.0%	4.7%	6.1%	7.3%	6.8%	6.1%	5.5%
40%	-8.9%	-9.4%	-9.5%	-9.6%	-9.6%	-9.3%	-8.7%	-4.6%	-1.4%	1.1%	3.2%	5.0%	6.5%	7.7%	8.8%	9.8%	10.7%
50%	-8.9%	-9.4%	-9.5%	-9.6%	-9.6%	-9.6%	-9.0%	-4.8%	-1.5%	1.1%	3.3%	5.2%	6.7%	8.0%	9.2%	10.2%	11.1%
60%	-8.9%	-9.4%	-9.5%	-9.6%	-9.6%	-9.6%	-9.2%	-4.9%	-1.6%	1.2%	3.4%	5.3%	6.9%	8.3%	9.5%	10.5%	11.4%
70%	-8.9%	-9.4%	-9.5%	-9.6%	-9.6%	-9.6%	-9.2%	-5.0%	-1.6%	1.2%	3.5%	5.4%	7.0%	8.4%	9.6%	10.7%	11.7%
80%	-8.9%	-9.4%	-9.5%	-9.6%	-9.6%	-9.6%	-9.2%	-5.0%	-1.6%	1.2%	3.5%	5.5%	7.1%	8.6%	9.8%	10.9%	11.8%
90%	-8.9%	-9.4%	-9.5%	-9.6%	-9.6%	-9.6%	-9.2%	-5.0%	-1.6%	1.2%	3.6%	5.5%	7.2%	8.7%	9.9%	11.0%	12.0%

Lowest kw

Red means higher than RRA

BC hydro
FOR GENERATIONS

MGS ALTERNATIVE B: 2 STEP DEMAND CHARGE + FLAT ENERGY RATE

F19 illustrative bill impact

Annual Consumption kWh

Highest kw

Load Factor

	10,000	30,000	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000
10%	1.3%	0.8%	3.5%	4.1%	4.4%	-0.8%	-6.0%	-7.4%	-8.3%	-9.1%	-9.6%	-10.1%	-10.5%	-10.8%	-11.0%	-11.3%	-11.5%
20%	1.3%	0.8%	0.6%	1.7%	2.2%	2.5%	3.0%	6.7%	9.6%	11.0%	9.7%	8.7%	7.9%	7.2%	6.6%	6.1%	5.7%
30%	1.3%	0.8%	0.6%	0.6%	1.2%	1.5%	2.1%	6.2%	9.4%	11.9%	14.0%	15.8%	17.3%	18.6%	18.0%	17.3%	16.7%
40%	1.3%	0.8%	0.6%	0.6%	0.6%	0.9%	1.5%	5.9%	9.3%	12.0%	14.2%	16.1%	17.7%	19.1%	20.2%	21.3%	22.2%
50%	1.3%	0.8%	0.6%	0.6%	0.6%	0.6%	1.2%	5.7%	9.2%	12.0%	14.4%	16.3%	18.0%	19.4%	20.6%	21.7%	22.6%
60%	1.3%	0.8%	0.6%	0.6%	0.6%	0.6%	1.0%	5.5%	9.1%	12.1%	14.4%	16.4%	18.1%	19.6%	20.9%	22.0%	23.0%
70%	1.3%	0.8%	0.6%	0.6%	0.6%	0.6%	1.0%	5.4%	9.1%	12.1%	14.5%	16.6%	18.3%	19.8%	21.1%	22.2%	23.2%
80%	1.3%	0.8%	0.6%	0.6%	0.6%	0.6%	1.0%	5.4%	9.1%	12.1%	14.6%	16.6%	18.4%	19.9%	21.2%	22.4%	23.4%
90%	1.3%	0.8%	0.6%	0.6%	0.6%	0.6%	1.0%	5.4%	9.1%	12.1%	14.6%	16.7%	18.5%	20.0%	21.4%	22.5%	23.6%

Lowest kw

Red means higher than cumulative CARC of 10.9% for F19

F19 illustrative % bill difference after RRA is excluded

Highest kw

Load Factor

*	10,000	30,000	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000
10%	-9.6%	-10.1%	-7.4%	-6.8%	-6.5%	-11.7%	-16.9%	-18.2%	-19.2%	-19.9%	-20.5%	-21.0%	-21.3%	-21.7%	-21.9%	-22.1%	-22.3%
20%	-9.6%	-10.1%	-10.2%	-9.1%	-8.7%	-8.4%	-7.9%	-4.2%	-1.3%	0.1%	-1.2%	-2.2%	-3.0%	-3.7%	-4.3%	-4.7%	-5.2%
30%	-9.6%	-10.1%	-10.2%	-10.3%	-9.7%	-9.4%	-8.8%	-4.7%	-1.5%	1.1%	3.2%	4.9%	6.4%	7.7%	7.2%	6.4%	5.8%
40%	-9.6%	-10.1%	-10.2%	-10.3%	-10.3%	-10.0%	-9.3%	-5.0%	-1.6%	1.1%	3.4%	5.2%	6.8%	8.2%	9.4%	10.4%	11.3%
50%	-9.6%	-10.1%	-10.2%	-10.3%	-10.3%	-10.3%	-9.7%	-5.2%	-1.7%	1.2%	3.5%	5.4%	7.1%	8.5%	9.7%	10.8%	11.8%
60%	-9.6%	-10.1%	-10.2%	-10.3%	-10.3%	-10.3%	-9.9%	-5.3%	-1.7%	1.2%	3.6%	5.6%	7.3%	8.7%	10.0%	11.1%	12.1%
70%	-9.6%	-10.1%	-10.2%	-10.3%	-10.3%	-10.3%	-9.9%	-5.4%	-1.8%	1.2%	3.6%	5.7%	7.4%	8.9%	10.2%	11.3%	12.4%
80%	-9.6%	-10.1%	-10.2%	-10.3%	-10.3%	-10.3%	-9.9%	-5.4%	-1.8%	1.2%	3.7%	5.8%	7.5%	9.0%	10.4%	11.5%	12.5%
90%	-9.6%	-10.1%	-10.2%	-10.3%	-10.3%	-10.3%	-9.9%	-5.4%	-1.8%	1.2%	3.7%	5.8%	7.6%	9.2%	10.5%	11.7%	12.7%

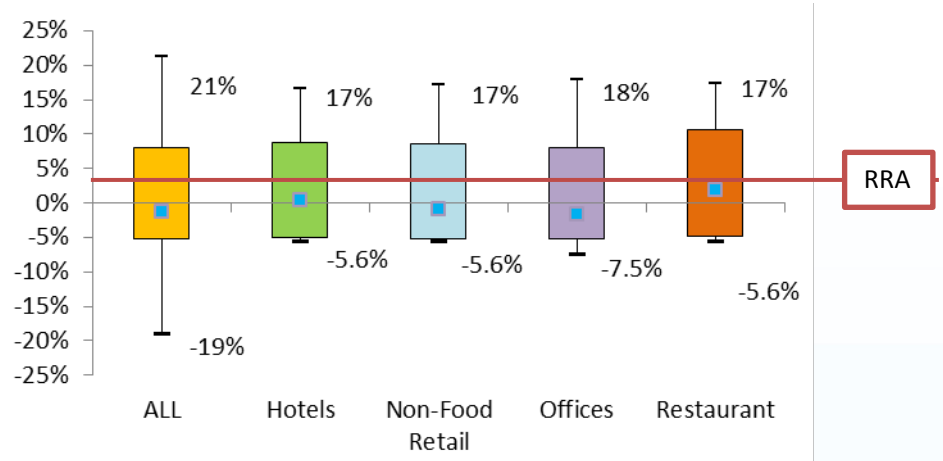
Lowest kw

Red means higher than RRA

BC hydro

FOR GENERATIONS

F2017 ILLUSTRATIVE BILL IMPACT



Boxes represent middle 60% of accounts

F17 Customer Segments	Proportion Better off than SQ	Median Bill of Segment	Median Bill Difference from SQ
All Customers	65%	$19,660	-$1,366
Hotel	62%	$19,310	-$151
Non Food Retail	63%	$19,731	-$1,451
Office	65%	$19,150	-$677
Restaurant	54%	$22,794	-$852

Adverse impacts:

- Magnitude softened at the extremes compared to flatten all demand tiers
- Low load factor, low consumption AND
- High load factor, high consumption

Most adversely impacted customer

- High consumption; T2 Energy
- Seasonal Consumption (kW range from 2 to 132)
- 46% load factor, 532 MWh/year - Industrial

Most benefitted customer

- Low load factor; T3 demand much cheaper
- 1.8% load factor, 56 MWh/year - Municipal Pumping

F17 COMPARATIVE ANALYSIS OF BILL IMPACT

Two Step Demand Charge

Annual Consumption kWh

Highest kw

Load Factor

	10,000	30,000	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000
10%	-4.9%	-5.4%	-2.9%	-2.3%	-2.1%	-6.9%	-11.8%	-13.1%	-14.0%	-14.7%	-15.2%	-15.6%	-16.0%	-16.3%	-16.5%	-16.8%	-16.9%
20%	-4.9%	-5.4%	-5.5%	-4.5%	-4.1%	-3.8%	-3.3%	0.1%	2.8%	4.2%	2.9%	2.0%	1.2%	0.6%	0.1%	-0.4%	-0.8%
30%	-4.9%	-5.4%	-5.5%	-5.6%	-5.1%	-4.7%	-4.2%	-0.4%	2.7%	5.1%	7.0%	8.7%	10.1%	11.3%	10.8%	10.1%	9.5%
40%	-4.9%	-5.4%	-5.5%	-5.6%	-5.6%	-5.3%	-4.7%	-0.6%	2.6%	5.1%	7.2%	9.0%	10.5%	11.7%	12.8%	13.8%	14.7%
50%	-4.9%	-5.4%	-5.5%	-5.6%	-5.6%	-5.6%	-5.0%	-0.8%	2.5%	5.1%	7.3%	9.2%	10.7%	12.0%	13.2%	14.2%	15.1%
60%	-4.9%	-5.4%	-5.5%	-5.6%	-5.6%	-5.6%	-5.2%	-0.9%	2.4%	5.2%	7.4%	9.3%	10.9%	12.3%	13.5%	14.5%	15.4%
70%	-4.9%	-5.4%	-5.5%	-5.6%	-5.6%	-5.6%	-5.2%	-1.0%	2.4%	5.2%	7.5%	9.4%	11.0%	12.4%	13.6%	14.7%	15.7%
80%	-4.9%	-5.4%	-5.5%	-5.6%	-5.6%	-5.6%	-5.2%	-1.0%	2.4%	5.2%	7.5%	9.5%	11.1%	12.6%	13.8%	14.9%	15.8%
90%	-4.9%	-5.4%	-5.5%	-5.6%	-5.6%	-5.6%	-5.2%	-1.0%	2.4%	5.2%	7.6%	9.5%	11.2%	12.7%	13.9%	15.0%	16.0%

Lowest kw

Red means higher than CARC of 4% for F17

Flat Demand Charge

Highest kw

Load Factor

*	10,000	30,000	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000
10%	23.5%	24.5%	-8.7%	-16.6%	-20.1%	-26.0%	-31.1%	-32.9%	-34.2%	-35.2%	-35.9%	-36.5%	-37.0%	-37.4%	-37.8%	-38.1%	-38.4%
20%	9.3%	9.6%	9.6%	-2.1%	-7.4%	-10.4%	-12.0%	-10.2%	-8.9%	-8.6%	-10.3%	-11.6%	-12.7%	-13.6%	-14.4%	-15.0%	-15.6%
30%	4.5%	4.6%	4.6%	4.6%	-1.2%	-4.7%	-6.6%	-4.5%	-3.0%	-1.7%	-0.6%	0.2%	1.0%	1.6%	0.7%	-0.2%	-1.0%
40%	2.2%	2.1%	2.1%	2.0%	2.0%	-1.4%	-3.4%	-1.2%	0.6%	2.0%	3.1%	4.1%	4.9%	5.6%	6.2%	6.8%	7.2%
50%	0.8%	0.6%	0.5%	0.5%	0.5%	0.5%	-1.3%	1.1%	2.9%	4.4%	5.6%	6.7%	7.5%	8.3%	8.9%	9.5%	10.0%
60%	-0.2%	-0.4%	-0.5%	-0.5%	-0.5%	0.5%	-0.1%	2.6%	4.6%	6.1%	7.4%	8.5%	9.4%	10.2%	10.9%	11.5%	12.0%
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90%	-1.8%	-2.1%	-2.2%	-2.2%	-2.2%	-2.2%	-1.8%	2.5%	6.1%	9.0%	10.6%	11.8%	12.8%	13.6%	14.4%	15.0%	15.6%

Lowest kw

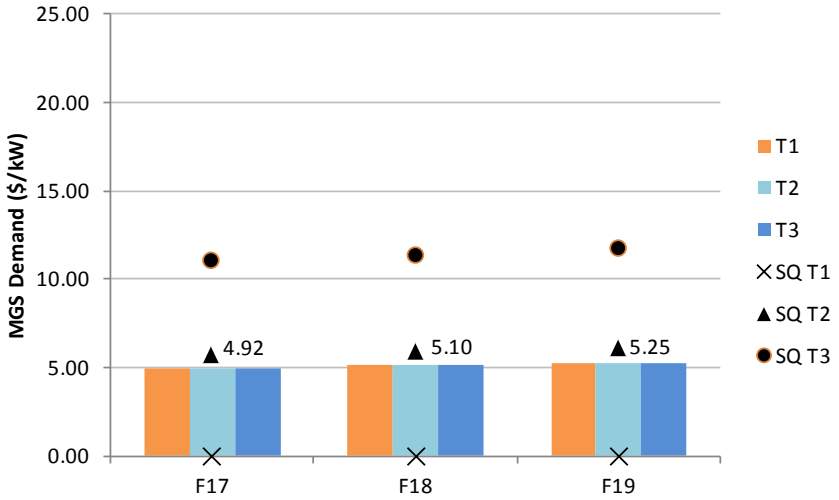
Red means higher than CARC of 4% for F17

BC hydro
FOR GENERATIONS

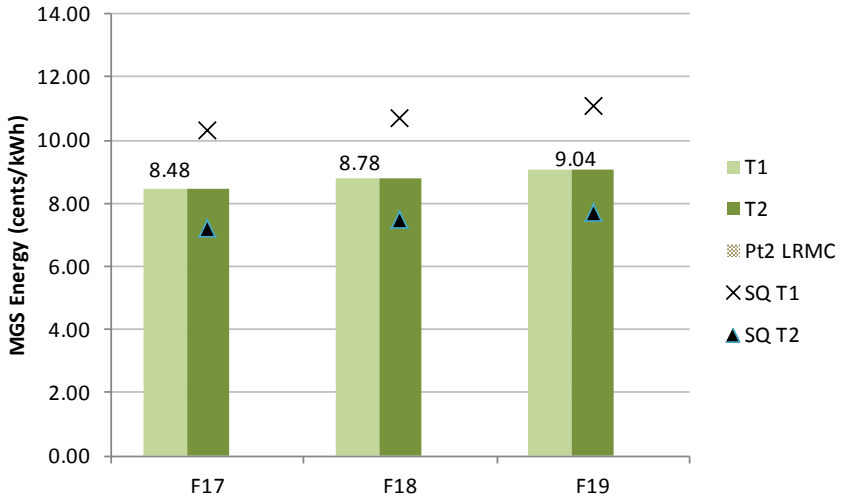
MGS DEMAND COST RECOVERY

- Stakeholders requested modelling increased MGS demand charge cost recovery; among other reasons, collecting more costs via demand charges should benefit customers with high load factors and high consumption
- Increase MGS demand cost recovery from ~15% to 35% for Flat Energy Rate/Flat Demand Charge Alternative for illustrative purposes
  - 35% is illustrative – chosen so energy rate remains close to LRMC
  - For reference: LGS demand cost recovery is ~50%
- BC Hydro open to feedback on modelling other levels of MGS demand charge cost recovery

MGS: 35% DEMAND COST RECOVERY



Demand Charges



Energy Charges

Illustrative Customer Bill (F2017)

Load Factor of 36%, Baseline Consumption = 153,240 kWh per year, Billed kW = 49 kW each month

Customer Scenario	Demand Charge	Energy Charge	Basic Charge	Total Bill	SQ Bill	Variance
Consume at baseline	$2,896	$12,998	$86	$15,979	$16,876	-$897 (-5%)
+ 5% from baseline	$2,896	$13,647	$86	$16,629	$17,650	-$1021 (-6%)
- 5% from baseline	$2,896	$12,348	$86	$15,329	$16,102	-$773 (-5%)

Note: Illustrative bill computation excludes rate rider, discounts, ratchets, and other provisions

Observations:

- Increased demand charge cost recovery and resulting lower energy charges benefit larger consuming customers

BC hydro
FOR GENERATIONS

F17 ILLUSTRATIVE SENSITIVITY ANALYSIS, FLAT ENERGY, NO BASELINE AND FLAT DEMAND – EXCLUDING RRA

35% cost recovery on demand excluding RRA

Highest kw

Load Factor

*	10,000	30,000	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000
10%	46.1%	48.5%	8.0%	-1.6%	-5.8%	-13.1%	-19.3%	-21.5%	-23.1%	-24.3%	-25.2%	-25.9%	-26.6%	-27.1%	-27.5%	-27.9%	-28.2%
20%	14.6%	15.4%	15.6%	2.8%	-3.0%	-6.2%	-7.9%	-6.0%	-4.6%	-4.2%	-6.0%	-7.5%	-8.7%	-9.7%	-10.5%	-11.2%	-11.8%
30%	4.1%	4.3%	4.4%	4.4%	-1.6%	-5.2%	-7.1%	-5.0%	-3.4%	-2.1%	-1.0%	-0.1%	0.7%	1.4%	0.5%	-0.5%	-1.3%
40%	-1.1%	-1.2%	-1.2%	-1.2%	-1.2%	-4.6%	-6.7%	-4.4%	-2.7%	-1.3%	-0.1%	0.9%	1.7%	2.4%	3.0%	3.6%	4.0%
50%	-4.3%	-4.5%	-4.6%	-4.6%	-4.6%	-4.6%	-6.4%	-4.1%	-2.2%	-0.7%	0.5%	1.5%	2.4%	3.1%	3.7%	4.3%	4.8%
60%	-6.4%	-6.7%	-6.8%	-6.8%	-6.9%	-6.9%	-6.5%	-3.8%	-1.9%	-0.4%	0.9%	1.9%	2.8%	3.6%	4.3%	4.8%	5.4%
70%	-7.9%	-8.3%	-8.4%	-8.4%	-8.5%	-8.5%	-8.1%	-3.8%	-1.6%	-0.1%	1.2%	2.3%	3.2%	4.0%	4.6%	5.2%	5.8%
80%	-9.0%	-9.5%	-9.6%	-9.6%	-9.7%	-9.7%	-9.3%	-5.1%	-1.7%	0.1%	1.4%	2.5%	3.5%	4.3%	4.9%	5.6%	6.1%
90%	-9.9%	-10.4%	-10.5%	-10.6%	-10.6%	-10.6%	-10.3%	-6.1%	-2.7%	0.1%	1.6%	2.7%	3.7%	4.5%	5.2%	5.8%	6.4%

Lowest kw

Red means higher than RRA

SQ: ~15% cost recovery on demand excluding RRA

Highest kw

Load Factor

*	10,000	30,000	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000
10%	19.5%	20.5%	-12.7%	-20.6%	-24.1%	-30.0%	-35.1%	-36.9%	-38.2%	-39.2%	-39.9%	-40.5%	-41.0%	-41.4%	-41.8%	-42.1%	-42.4%
20%	5.3%	5.6%	5.6%	-6.1%	-11.4%	-14.4%	-16.0%	-14.2%	-12.9%	-12.6%	-14.3%	-15.6%	-16.7%	-17.6%	-18.4%	-19.0%	-19.6%
30%	0.5%	0.6%	0.6%	0.6%	-5.2%	-8.7%	-10.6%	-8.5%	-7.0%	-5.7%	-4.6%	-3.8%	-3.0%	-2.4%	-3.3%	-4.2%	-5.0%
40%	-1.8%	-1.9%	-1.9%	-2.0%	-2.0%	-5.4%	-7.4%	-5.2%	-3.4%	-2.0%	-0.9%	0.1%	0.9%	1.6%	2.2%	2.8%	3.2%
50%	-3.2%	-3.4%	-3.5%	-3.5%	-3.5%	-3.5%	-5.3%	-2.9%	-1.1%	0.4%	1.6%	2.7%	3.5%	4.3%	4.9%	5.5%	6.0%
60%	-4.2%	-4.4%	-4.5%	-4.5%	-4.5%	-4.5%	-4.1%	-1.4%	0.6%	2.1%	3.4%	4.5%	5.4%	6.2%	6.9%	7.5%	8.0%
70%	-4.9%	-5.1%	-5.2%	-5.2%	-5.2%	-5.2%	-4.8%	-0.4%	1.8%	3.4%	4.8%	5.9%	6.8%	7.6%	8.3%	9.0%	9.5%
80%	-5.4%	-5.7%	-5.7%	-5.8%	-5.8%	-5.8%	-5.4%	-1.0%	2.5%	4.4%	5.8%	6.9%	7.9%	8.7%	9.5%	10.1%	10.7%
90%	-5.8%	-6.1%	-6.2%	-6.2%	-6.2%	-6.2%	-5.8%	-1.5%	2.1%	5.0%	6.6%	7.8%	8.8%	9.6%	10.4%	11.0%	11.6%

Lowest kw

Red means higher than RRA

More intense green indicates higher bill impact
Most “typical” customers as defined by kWh and Load Factor fall approximately within the blue oval area
Major assumption: customers have the annual max kW for all months

F17 ILLUSTRATIVE SENSITIVITY ANALYSIS, FLAT ENERGY, NO BASELINE AND FLAT DEMAND

35% cost recovery on demand

Highest kw

Load Factor

*	10,000	30,000	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000
10%	50.1%	52.5%	12.0%	2.4%	-1.8%	-9.1%	-15.3%	-17.5%	-19.1%	-20.3%	-21.2%	-21.9%	-22.6%	-23.1%	-23.5%	-23.9%	-24.2%
20%	18.6%	19.4%	19.6%	6.8%	1.0%	-2.2%	-3.9%	-2.0%	-0.6%	-0.2%	-2.0%	-3.5%	-4.7%	-5.7%	-6.5%	-7.2%	-7.8%
30%	8.1%	8.3%	8.4%	8.4%	2.4%	-1.2%	-3.1%	-1.0%	0.6%	1.9%	3.0%	3.9%	4.7%	5.4%	4.5%	3.5%	2.7%
40%	2.9%	2.8%	2.8%	2.8%	2.8%	-0.6%	-2.7%	-0.4%	1.3%	2.7%	3.9%	4.9%	5.7%	6.4%	7.0%	7.6%	8.0%
50%	-0.3%	-0.5%	-0.6%	-0.6%	-0.6%	-0.6%	-2.4%	-0.1%	1.8%	3.3%	4.5%	5.5%	6.4%	7.1%	7.7%	8.3%	8.8%
60%	-2.4%	-2.7%	-2.8%	-2.8%	-2.9%	-2.9%	-2.5%	0.2%	2.1%	3.6%	4.9%	5.9%	6.8%	7.6%	8.3%	8.8%	9.4%
70%	-3.9%	-4.3%	-4.4%	-4.4%	-4.5%	-4.5%	-4.1%	0.2%	2.4%	3.9%	5.2%	6.3%	7.2%	8.0%	8.6%	9.2%	9.8%
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90%	-5.9%	-6.4%	-6.5%	-6.6%	-6.6%	-6.6%	-6.3%	-2.1%	1.3%	4.1%	5.6%	6.7%	7.7%	8.5%	9.2%	9.8%	10.4%

Lowest kw

Red means higher than CARC of 4% for F17

SQ: ~15% cost recovery on demand

Highest kw

Load Factor

*	10,000	30,000	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000
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20%	9.3%	9.6%	9.6%	-2.1%	-7.4%	-10.4%	-12.0%	-10.2%	-8.9%	-8.6%	-10.3%	-11.6%	-12.7%	-13.6%	-14.4%	-15.0%	-15.6%
30%	4.5%	4.6%	4.6%	4.6%	-1.2%	-4.7%	-6.6%	-4.5%	-3.0%	-1.7%	-0.6%	0.2%	1.0%	1.6%	0.7%	-0.2%	-1.0%
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50%	0.8%	0.6%	0.5%	0.5%	0.5%	0.5%	-1.3%	1.1%	2.9%	4.4%	5.6%	6.7%	7.5%	8.3%	8.9%	9.5%	10.0%
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90%	-1.8%	-2.1%	-2.2%	-2.2%	-2.2%	-2.2%	-1.8%	2.5%	6.1%	9.0%	10.6%	11.8%	12.8%	13.6%	14.4%	15.0%	15.6%

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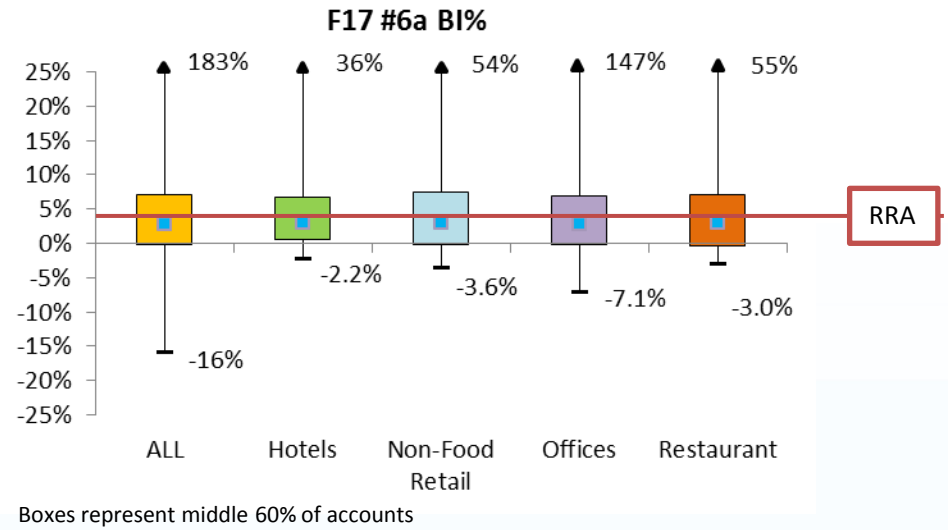


Boxes represent middle 60% of accounts

F17 Customer Segments	Proportion Better off than SQ	Median Bill of Segment	Median Bill Difference from SQ
All Customers	65%	$ 20,047.94	-$978
Hotel	62%	$ 21,624	$2,163
Non Food Retail	63%	$ 19,784	-$1,398
Office	65%	$ 21,508	$1,682
Restaurant	54%	$ 22,263	-$1,382

Observations

- Large extremes
- More customers better off

Most adversely impacted customer

- Low load-factor, low consumption customer
- 3700 kWh/year, 1% load factor - Wood.

Most benefitted customer

- Low load-factor, medium consumption customer
- 56,000 kWh/year, 1.8% load factor - Municipal Pumping

ILLUSTRATIVE MGS TRANSITION OPTIONS

HISTORY

- 2007 RDA: Three staged, three year transition strategy to LGS flat energy, flat demand charge
- 2009 LGS Application: Staged, two to three year transition strategy:
- LGS transitioned to new rate in one group on 1 January 2011
- MGS divided into two groups (MGS1 and MGS2/3) for purposes of transitioning
  - All MGS customers transitioned to new rate by 1 April 2013

ILLUSTRATIVE MGS TRANSITION TO FLAT ENERGY RATE, FLAT DEMAND CHARGE

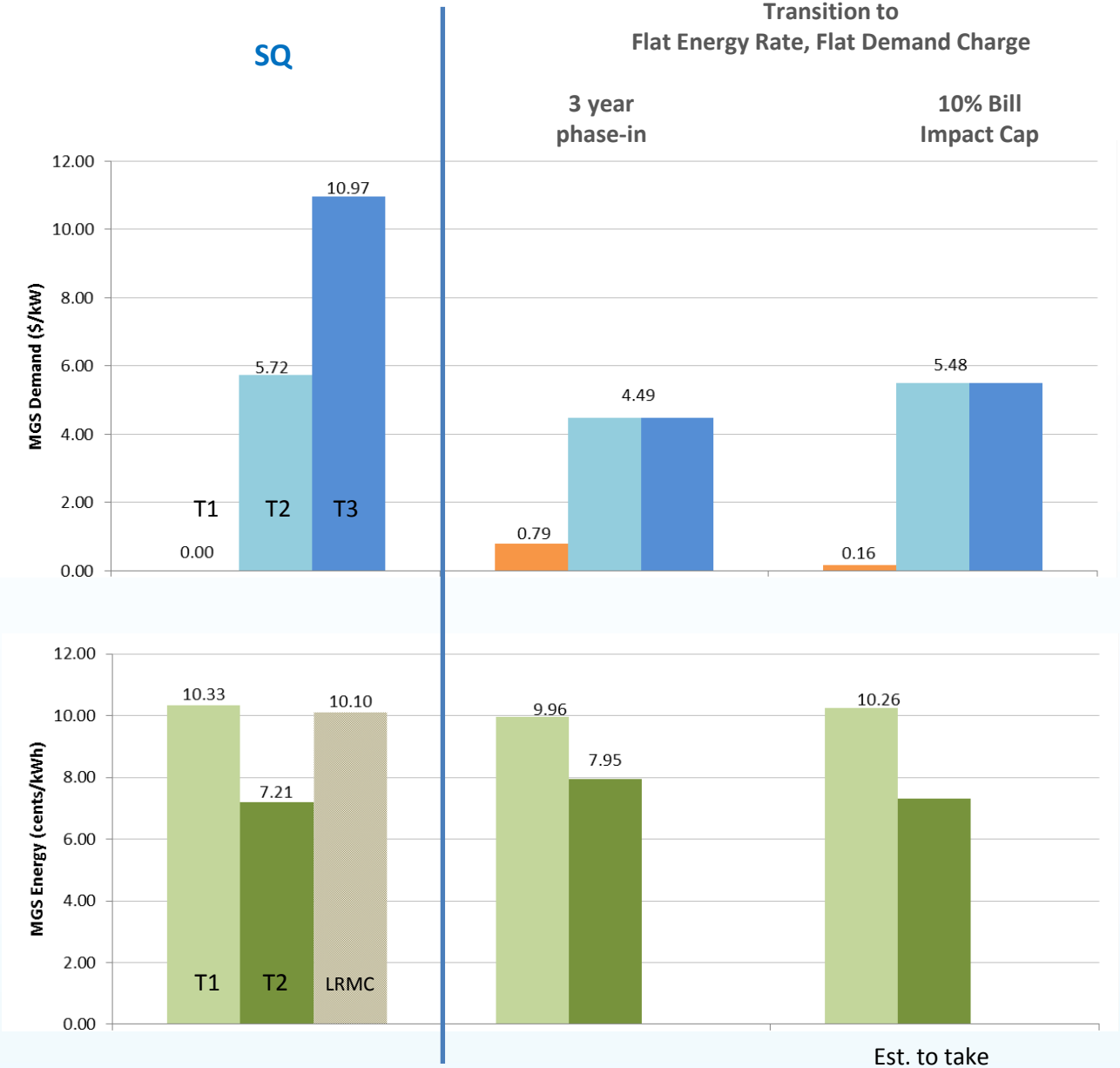
High Level Options:

1. Effect of Phase-In over 3 years to Flat Energy, using equal increments on T1/T2 Ratios, given Flat Demand (Flat All Tiers)
   - BCUC precedent
   - Maximum bill impact under 10% for most customers,
2. Quick estimate of years required to phase-into-flat energy and flat demand if 10% cap is implemented
   - Question practicality
   - Long period of time – frustrating rate stability (Bonbright criterion)

MGS RATE ALTERNATIVES F2017 - ILLUSTRATIVE TRANSITION

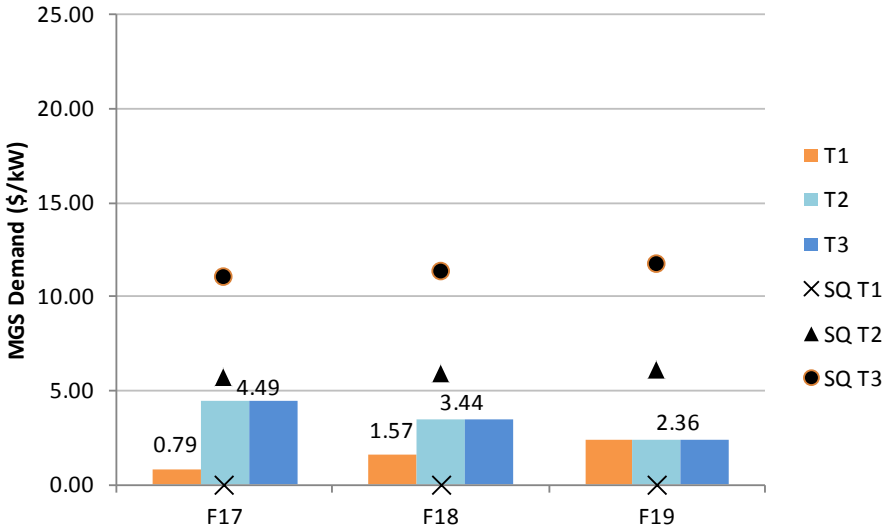
Demand Charge
T1 (First 35kW)
T2 (35 to 150kW)
T3 (>150kW)

Energy Charge
T1 (Pt 1 first 14800 kWh/mo)
T2 (Pt 1 >14800 kWh/mo)
Pt 2 LRMC (Credit/Charge)

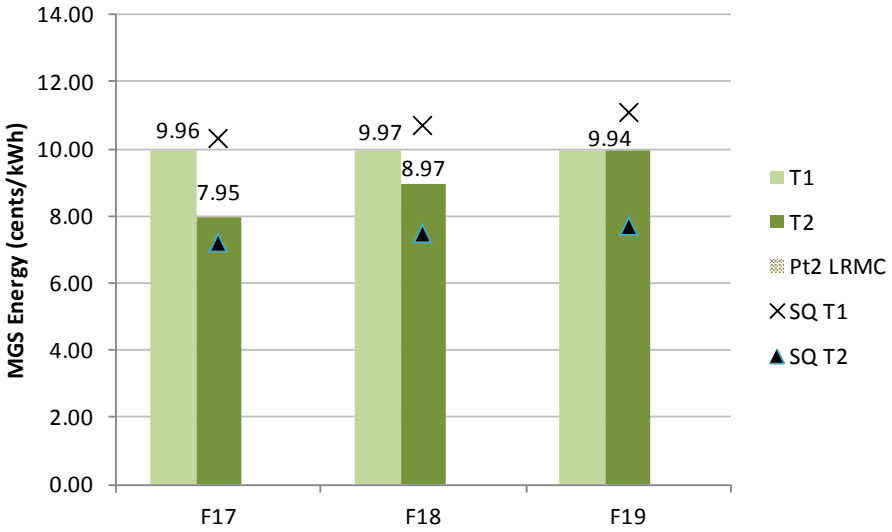


Est. to take over 15yrs to get to flat

MGS: TRANSITION ALTERNATIVE 1: 3-YEAR PHASE-IN



Demand Charges



Energy Charges

Illustrative Customer Bill (F2017)

Load Factor of 36%, Baseline Consumption = 153,240kWh per year, Billed kW = 49kW each month

Customer Scenario	Demand Charge	Energy Charge	Basic Charge	Total Bill	SQ Bill	Variance
Consume at baseline	$1,084	$15,263	$86	$16,433	$16,876	-$444 (-3%)
+ 5% from baseline	$1,084	$16,026	$86	$17,196	$17,650	-$455 (-3%)
- 5% from baseline	$1,084	$14,500	$86	$15,669	$16,102	-$433 (-3%)

Note: Illustrative bill computation excludes rate rider, discounts, ratchets, and other provisions

Observations:

- Softens impact in early years but same cumulative impact by F19
- Annual bill impacts exceed 10% for small consumption, low load factor customers

MGS: TRANSITION ALTERNATIVE 1: 3-YEAR PHASE-IN (INCLUDES RRA)

Annual Consumption kWh

Highest kw

Load Factor

F17	10,000	30,000	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000
10%	11.1%	11.4%	-0.4%	-3.1%	-4.4%	-9.9%	-15.2%	-18.3%	-20.5%	-22.2%	-23.5%	-24.5%	-25.4%	-26.1%	-26.7%	-27.2%	-27.7%
20%	6.0%	6.1%	6.1%	2.0%	0.1%	-0.9%	-1.5%	-0.9%	-0.4%	-0.8%	-3.3%	-5.2%	-6.8%	-8.1%	-9.2%	-10.2%	-11.0%
30%	4.3%	4.3%	4.4%	4.4%	2.3%	1.1%	0.4%	1.1%	1.7%	2.1%	2.5%	2.8%	3.1%	3.3%	2.1%	0.8%	-0.3%
40%	3.5%	3.5%	3.5%	3.4%	3.4%	2.2%	1.5%	2.3%	2.9%	3.4%	3.8%	4.2%	4.5%	4.7%	4.9%	5.1%	5.3%
50%	3.0%	2.9%	2.9%	2.9%	2.9%	2.9%	2.3%	3.1%	3.8%	4.3%	4.7%	5.1%	5.4%	5.7%	5.9%	6.1%	6.3%
60%	2.6%	2.6%	2.6%	2.5%	2.5%	2.5%	2.7%	3.7%	4.3%	4.9%	5.4%	5.7%	6.1%	6.3%	6.6%	6.8%	7.0%
70%	2.4%	2.3%	2.3%	2.3%	2.3%	2.3%	2.4%	4.0%	4.8%	5.4%	5.8%	6.2%	6.6%	6.9%	7.1%	7.3%	7.5%
80%	2.2%	2.1%	2.1%	2.1%	2.1%	2.1%	2.2%	3.8%	5.0%	5.7%	6.2%	6.6%	6.9%	7.2%	7.5%	7.7%	7.9%
90%	2.1%	2.0%	2.0%	1.9%	1.9%	1.9%	2.1%	3.6%	4.9%	5.9%	6.5%	6.9%	7.3%	7.6%	7.8%	8.1%	8.3%

Lowest kw

Red means higher than CARC of 4% for F17

Load Factor

F18	10,000	30,000	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000
10%	21.4%	22.2%	-1.4%	-7.0%	-9.4%	-15.4%	-20.7%	-23.2%	-25.0%	-26.4%	-27.4%	-28.3%	-29.0%	-29.5%	-30.0%	-30.4%	-30.8%
20%	11.4%	11.6%	11.6%	3.3%	-0.5%	-2.5%	-3.7%	-2.4%	-1.5%	-1.5%	-3.6%	-5.3%	-6.7%	-7.8%	-8.8%	-9.6%	-10.3%
30%	8.0%	8.0%	8.1%	8.1%	3.9%	1.5%	0.1%	1.6%	2.8%	3.7%	4.4%	5.0%	5.6%	6.0%	5.0%	3.8%	2.9%
40%	6.4%	6.3%	6.3%	6.3%	6.3%	3.8%	2.4%	4.0%	5.3%	6.3%	7.1%	7.8%	8.4%	8.9%	9.3%	9.7%	10.0%
50%	5.3%	5.2%	5.2%	5.2%	5.2%	5.2%	3.9%	5.6%	6.9%	8.0%	8.9%	9.6%	10.2%	10.8%	11.3%	11.7%	12.0%
60%	4.7%	4.5%	4.5%	4.5%	4.5%	4.5%	4.7%	6.7%	8.1%	9.2%	10.1%	10.9%	11.6%	12.1%	12.6%	13.1%	13.4%
70%	4.2%	4.0%	4.0%	3.9%	3.9%	3.9%	4.2%	7.4%	9.0%	10.1%	11.1%	11.9%	12.6%	13.2%	13.7%	14.1%	14.5%
80%	3.8%	3.6%	3.6%	3.6%	3.6%	3.5%	3.8%	7.0%	9.5%	10.9%	11.8%	12.7%	13.3%	13.9%	14.5%	14.9%	15.3%
90%	3.6%	3.3%	3.3%	3.3%	3.3%	3.2%	3.5%	6.6%	9.2%	11.3%	12.4%	13.3%	14.0%	14.6%	15.1%	15.6%	16.0%

Red means higher than cumulative CARC of 7.6% (Cumulative increase between F16 and F18)

Load Factor

F19	10,000	30,000	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000
10%	31.5%	32.6%	-2.8%	-11.2%	-14.9%	-21.2%	-26.6%	-28.5%	-29.9%	-31.0%	-31.8%	-32.4%	-32.9%	-33.4%	-33.8%	-34.1%	-34.4%
20%	16.4%	16.7%	16.8%	4.3%	-1.4%	-4.6%	-6.2%	-4.4%	-3.0%	-2.6%	-4.4%	-5.9%	-7.0%	-8.0%	-8.8%	-9.5%	-10.1%
30%	11.4%	11.4%	11.4%	11.4%	5.2%	1.5%	-0.5%	1.7%	3.4%	4.7%	5.8%	6.8%	7.6%	8.2%	7.3%	6.3%	5.5%
40%	8.8%	8.7%	8.7%	8.7%	8.7%	5.1%	2.9%	5.3%	7.1%	8.6%	9.9%	10.9%	11.8%	12.5%	13.2%	13.7%	14.2%
50%	7.3%	7.1%	7.1%	7.1%	7.1%	7.1%	5.1%	7.6%	9.6%	11.2%	12.5%	13.6%	14.6%	15.4%	16.1%	16.7%	17.2%
60%	6.3%	6.1%	6.0%	6.0%	6.0%	6.0%	6.4%	9.3%	11.4%	13.1%	14.4%	15.6%	16.6%	17.4%	18.1%	18.8%	19.3%
70%	5.6%	5.3%	5.3%	5.2%	5.2%	5.2%	5.6%	10.3%	12.7%	14.5%	15.9%	17.0%	18.1%	18.9%	19.7%	20.3%	20.9%
80%	5.1%	4.8%	4.7%	4.6%	4.6%	4.6%	5.0%	9.7%	13.5%	15.5%	17.0%	18.2%	19.2%	20.1%	20.9%	21.6%	22.1%
90%	4.7%	4.3%	4.2%	4.2%	4.2%	4.2%	4.6%	9.2%	13.0%	16.1%	17.9%	19.1%	20.1%	21.1%	21.8%	22.5%	23.1%

Red means higher than cumulative CARC of 10.9% (Cumulative increase between F16 and F19)

F19 Same as 3

TRANSITION ALTERNATIVE 2: PHASE-IN USING 10% BILL IMPACT CAP

- Phase-in estimated to take over **15 years,** given current assumptions
- Extremely small incremental changes to soften bill impact experienced by low consuming, low load-factor customers
  - SQ bill range: $500 to $16,000
  - kWh range: 3600 kWh to 60,000 kWh/year
  - Max kW range: 29 kW to 349 kW
  - Estimated # customers: 360

CONCLUSION – REQUEST FOR FEEDBACK

BC Hydro seeking feedback on the following:

1. **Segmentation** – What other analysis should be conducted?
2. **SGS** - Should BC Hydro increase SGS basic charge cost recovery to match that of RIB rate basic charge cost recovery?
3. **MGS**
   - Which of the three demand charge structure alternatives is preferred (with reasons)?
   - Should the MGS demand charge cost recovery be increased, and if so to what level (with reasons)?
   - Which of the two high-level alternative MGS rate transition strategies is preferred (with reasons)?

THANK YOU

SEND COMMENTS TO:
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BC hydro
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