2015 RATE DESIGN APPLICATION (RDA) WORKSHOP NO. 8A

LARGE GENERAL SERVICE (LGS), MEDIUM GENERAL SERVICE (MGS) AND SMALL GENERAL SERVICE (SGS) RATE STRUCTURES: SESSION 1: EXISTING RATE STRUCTURES



January 21, 2015

WORKSHOP STRUCTURE AND PURPOSE

- LGS/MGS Workshop 1 broken into 2 sessions:
 - Session 1: Purpose is to review regulatory history and existing rate structures
 - Session 2: Purpose is to review alternatives to the existing rate structures (February 11, 2015)
- Written comment period will begin at the posting of the Session 2 workshop notes
 - Comments can be provided at today's workshop, or in the intervening period



WORKSHOP OUTLINE

- **1.** Topic #1: Overview
 - Rate class structure and segmentation
 - Regulatory history
 - Overview of LGS, MGS and SGS rate structures
- 2. Topic #2: LGS and MGS customer characteristics
- 3. Topic #3: Existing LGS and MGS rate structures
 - How the rate structures work
 - Evaluation reports for calendar years 2011-2012 and for F2014
 - Customer and administrative issues
 - Jurisdictional assessment
 - Bonbright assessment
 - Three alternative rate structure categories
- 4. Topic #4: SGS
- 5. Topic #5: Voluntary Time of Use rates (TOU) for General Service (GS) customers
- 6. Next steps



TOPIC #1 OVERVIEW



THREE GS CLASSES

- Three GS classes purchase electricity at the distribution voltage level:
 - LGS annual peak demand of at least 150 kilowatts (kW) or use more than 550,000 kilowatt hours (kWh) of electricity per year – Rate Schedules (RS) 1600, 1601, 1610 or 1611 ~ 7,000 accounts
 - MGS annual peak demand of between 35 kW and 150 kW or with less than 550,000 kWh of electricity per year – RS 1500, 1501, 1510 or 1511 ~ 16,500 accounts
 - SGS annual peak demand of less than 35 kW RS 1300, 1301, 1310 or 1311
 ~ 170,000 accounts



SEGMENTATION

- Customer accounts should be segmented using readily observable variable that can be easily understood, together with other factors such as customer understanding and practicality of tariff administration
- Maintaining existing segmentation allows stability and continuity for customers' ease of understanding
- Survey of utilities indicates maximum kW demand is most commonly used variable
- British Columbia Utilities Commission (BCUC) approved LGS/MGS segmentation in 2010 as part of introduction of LGS/MGS rates
 - Based on statistical clustering of accounts by kW size identified 150 kW as a breakpoint for LGS/MGS



SEGMENTATION

- SGS 35 kW breakpoint has existed since at least 1974 and is driven principally by metering practice:
 - SGS customers do not have demand meters
 - Most Canadian jurisdictions segment GS customers into larger and smaller GS categories



REGULATORY HISTORY – LGS & MGS

LGS Prior to 2007 RDA

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

2007 Energy Plan

- Policy Action No. 4: Explore with BC utilities new rate structures that encourage energy efficiency and conservation
- <u>BC Hydro position</u>: 2007 Energy Plan does not require that all rates be conservation rates and does not oblige BCUC to ignore established Bonbright rate design criteria in favour of a conservation objective, or to prioritize Bonbright efficiency criterion over the other seven criteria

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

- Encourage conservation
- Not unduly harm or benefit its customers
- Achieving rate structure conservation and minimizing bill impacts to customers are conflicting objectives
- A two-part baseline rate ("baseline") approach is the only conservation rate structure that would alleviate bill impact issue



REGULATORY HISTORY – LGS & MGS

- BC Hydro filed its LGS Application in 2009
- BC Hydro proposed a two part baseline energy rate for LGS customers:
 - Emphasized novelty and complexity of introducing a baseline rate to LGS
 - Transmission service (TSR): in place since April, 2006 only about 100 customers, permitting customers and BC Hydro to make numerous baseline adjustments
 - In contrast, cannot offer LGS this degree of customization requires administration to be as mechanical and automated as possible, without expressly allowing for unique customer circumstances
 - A two-part baseline rate design is complicated, making it more suitable for larger customers
- Although BC Hydro's proposal did not include a baseline rate for MGS customers, the baseline rate concept was extended to MGS customers through the 2010 Negotiated Settlement Agreement (NSA)



REGULATORY HISTORY LGS AND MGS IMPLEMENTATION

• NSA

- Two part energy rates (baseline) for both LGS and MGS
- The use of a baseline 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 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 (MGS1 and MGS2/3) for purposes of transitioning
 - All MGS customers transitioned to new rate by 1 April 2013



OVERVIEW OF LGS AND MGS RATES

• LGS and MGS rates have an energy charge, demand charge and basic charge

• <u>Two part energy charge</u>

- LGS/MGS are first (and to date only) default baseline rates for GS in North America
- Part 2 of energy rate provides credit when consumption is lower than the baseline, and a higher charge when consumption is higher than the baseline
- The LRMC portion of Part 2 is priced at a higher level than the base rate (referred to as Part 1)

Inclining demand charge

- Most jurisdictions have flat or declining demand charges to reflect that average cost for transmission and distribution of electricity decreases as greater load is supplied
- Some demand charges do not charge for an initial small block of demand



LGS – 2015 RATES



MGS – F2015 RATES

Basic Charge:



21.29 cents/day

Demand Charge:



Energy Charge:



REGULATORY HISTORY – SGS

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



SGS – F2015 RATES

Basic Charge:



21.29 cents/day

• Minimum charge is equal to basic charge

Energy Charge:



TOPIC #2

LGS AND MGS CUSTOMER CHARACTERISTICS

BG hydro & For generations

LGS AND MGS CUSTOMER CHARACTERISTICS INTRODUCTION

- 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 dependent on industry

- In comparison, Residential class is a homogeneous group
 - Consumption mostly driven by a small set of dwelling types
 - Less diverse consumption pattern



LGS CUSTOMERS

- Consumption driven by site type (type of business)
- Consumption levels vary widely by site type





MGS CUSTOMERS

- Consumption driven by site type (type of business)
- Consumption levels vary widely by site type



Median Annual Consumption by Site Type



LGS: TOP 10 SITE TYPES, BY GWH



Note: The site type of each account is determined by the best available information, which is an amalgamation of North American Industry Classification System (NAICS) code, premise code and other available information supplied by the customer

- Total LGS class consumption in F2014 = 10,746 gigawatt hours (GWh)
- Top 10 site types consume about 69% of energy (4,400 out of ~ 7000 accounts)



LGS: ANNUAL CONSUMPTION DISTRIBUTION F2014, BOX PLOT





LGS: ANNUAL LOAD FACTOR ACCOUNT DISTRIBUTION BY CONSUMPTION (ABOUT 7000 ACCOUNTS IN F2014)



- Typical customers consume between 600 megawatt hours (MWh) per year and 1,700 MWh per year, with a load factor between 30% and 60%
- Load factor generally increases as consumption increases

Annual Consumption (1000 kWh)

	0	200	400	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	Total
0%	1.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%
10%	1.1%	2.6%	0.8%	0.3%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.1%
20%	1.0%	2.3%	2.6%	1.2%	0.8%	0.4%	0.2%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	9.2%
30%	1.1%	1.4%	3.8%	3.1%	1.8%	1.0%	0.6%	0.4%	0.3%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	14.2%
40%	0.7%	1.0%	2.0%	4.1%	2.8%	1.8%	1.3%	0.9%	0.6%	0.4%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.1%	17.0%
50%	0.6%	1.0%	1.4%	3.7%	3.3%	1.9%	1.4%	1.1%	0.8%	0.6%	0.6%	0.3%	0.4%	0.2%	0.2%	0.2%	0.1%	17.8%
60%	0.4%	0.9%	0.9%	2.8%	1.9%	1.6%	1.0%	1.0%	0.5%	0.5%	0.4%	0.5%	0.3%	0.3%	0.3%	0.2%	0.2%	13.7%
70%	0.3%	0.4%	0.5%	1.6%	1.2%	0.8%	0.8%	0.5%	0.6%	0.5%	0.5%	0.4%	0.3%	0.2%	0.2%	0.1%	0.1%	9.2%
80%	0.2%	0.3%	0.2%	0.6%	0.4%	0.2%	0.3%	0.3%	0.1%	0.2%	0.3%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	3.6%
90%	0.1%	0.1%	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%
100%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Total 🛅	6.5%	10.3%	12.4%	17.6%	12.5%	7.8%	5.7%	4.4%	3.0%	2.6%	2.1%	1.7%	1.4%	1.2%	1.2%	0.7%	0.7%	90.9%

FOR GENERATIONS

Note: 9% accounts higher than 3200 MWh

Red font indicates peak of distribution for each kWh series.

LGS: ANNUAL LOAD FACTOR ACCOUNT DISTRIBUTION BY MAX ANNUAL DEMAND (ABOUT 7000 ACCOUNTS IN F2014)



Annual Load Factor LGS

- No pattern between load factor and maximum kW
- Typical customers have max annual demand between 120 and 320 kW

IVIGS/LGS IIIIgration threshold	MGS/LGS	migration	threshold
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Annual Maximum	Demand	(kW
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		0	40	80	120	160	200	240	280	320	360	400	440	480	520	560	600	640	Total
	0%	0.0%	0.0%	0.1%	0.1%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%
	10%	0.1%	0.2%	0.2%	0.4%	0.9%	0.9%	0.5%	0.5%	0.4%	0.2%	0.1%	0.1%	0.1%	0.1%	0.2%	0.0%	0.1%	4.7%
	20%	0.2%	0.5%	0.4%	0.7%	1.3%	1.4%	0.9%	0.6%	0.5%	0.5%	0.3%	0.3%	0.3%	0.2%	0.1%	0.1%	0.1%	8.4%
	30%	0.2%	0.6%	0.5%	1.2%	2.7%	2.2%	1.4%	1.1%	0.9%	0.7%	0.5%	0.4%	0.4%	0.2%	0.2%	0.2%	0.1%	13.5%
r	40%	0.1%	0.4%	0.6%	1.6%	3.3%	2.8%	1.6%	1.2%	1.0%	1.1%	0.5%	0.5%	0.5%	0.2%	0.2%	0.2%	0.1%	16.1%
acte	50%	0.1%	0.3%	0.5%	3.1%	3.5%	2.6%	1.7%	1.3%	1.1%	0.8%	0.6%	0.5%	0.4%	0.4%	0.2%	0.3%	0.3%	17.5%
ш	60%	0.1%	0.1%	0.9%	3.3%	2.1%	1.6%	1.2%	1.0%	0.7%	0.5%	0.5%	0.5%	0.3%	0.3%	0.2%	0.3%	0.3%	13.9%
oac	70%	0.1%	0.1%	1.3%	2.1%	1.0%	1.0%	0.7%	0.6%	0.7%	0.5%	0.5%	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	9.5%
Ľ	80%	0.0%	0.1%	0.6%	0.7%	0.4%	0.3%	0.3%	0.3%	0.2%	0.3%	0.2%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	3.7%
	90%	0.0%	0.1%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%
	100%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
	Total	0.9%	2.6%	5.2%	13.2%	15.5%	13.0%	8.6%	6.6%	5.7%	4.6%	3.2%	2.5%	2.3%	1.6%	1.1%	1.1%	1.1%	88.7%

FOR GENERATIONS

Note: 11% accounts higher than 640 KW 23

Red font indicates peak of distribution for each kW series.

MGS: TOP 10 SITE TYPES, BY GWH



Note: The site type of each account is determined by the best available information, which is an amalgamation of NAICS code, premise code and other available information supplied by the customer

- Total MGS class consumption in F2014 = 3,300 GWh
- Top 10 Site types consume about 78% of energy (14,400 out of ~ 16,500 accounts)



MGS: ANNUAL CONSUMPTION DISTRIBUTION F2014, BOX PLOT



MGS: ANNUAL LOAD FACTOR ACCOUNT DISTRIBUTION BY CONSUMPTION (ABOUT 16,500 ACCOUNTS IN F2014)



- Typical consumption between 100 MWh per year and 290 MWh per year with load factor between 20% and 50%
- Load factor generally increases as consumption increases

Annual Consumption MWh

[0	30	60	90	120	150	180	210	240	270	300	330	360	390	420	450	480	Total
	0%	0.0%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%
	10%	1.6%	2.1%	2.2%	1.0%	0.5%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.8%
	20%	1.1%	1.3%	2.5%	4.0%	2.6%	1.4%	1.0%	0.8%	0.5%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	15.5%
2	30%	0.8%	1.3%	1.2%	3.0%	4.7%	3.8%	2.6%	1.6%	1.4%	1.0%	0.7%	0.6%	0.3%	0.2%	0.1%	0.1%	0.0%	23.3%
ช [40%	0.6%	1.0%	1.0%	0.8%	2.3%	3.4%	2.9%	2.1%	1.9%	1.3%	1.0%	0.9%	0.7%	0.6%	0.5%	0.4%	0.2%	21.4%
ad Fa	50%	0.5%	0.7%	0.5%	0.5%	0.4%	1.1%	1.7%	1.8%	1.3%	1.3%	0.9%	0.7%	0.7%	0.7%	0.6%	0.4%	0.4%	14.1%
	60%	0.2%	0.5%	0.4%	0.3%	0.2%	0.2%	0.6%	0.9%	0.8%	0.7%	0.7%	0.5%	0.7%	0.5%	0.3%	0.2%	0.3%	7.9%
ן ב	70%	0.1%	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.3%	0.5%	0.5%	0.4%	0.3%	0.3%	0.3%	0.2%	0.2%	0.1%	4.2%
	80%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.1%	0.0%	1.4%
	90%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
	100%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	5.0%	7.8%	8.1%	9.9%	10.8%	10.3%	9.0%	7.5%	6.5%	5.0%	3.9%	3.1%	2.8%	2.4%	1.8%	1.3%	1.1%	96.4%

FOR GENERATIONS

Note: 3.6% accounts higher than 480 MWh

MGS: ANNUAL LOAD FACTOR ACCOUNT DISTRIBUTION BY MAX ANNUAL DEMAND (ABOUT 16,500 ACCOUNTS IN F2014)



Annual Load Factor MGS



MGS/LGS migration threshold

Annual Maximum Demand (kW)

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	Total
0%	0.0%	0.1%	0.1%	0.2%	0.3%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	1.7%
10%	0.2%	0.5%	0.4%	0.5%	1.2%	1.1%	0.9%	0.7%	0.6%	0.4%	0.3%	0.3%	0.2%	0.1%	0.1%	0.1%	0.1%	7.5%
20%	0.1%	0.5%	0.3%	0.8%	2.5%	2.8%	2.0%	1.6%	1.2%	0.8%	0.8%	0.6%	0.4%	0.3%	0.2%	0.2%	0.1%	15.2%
30%	0.1%	0.3%	0.4%	1.2%	4.1%	4.4%	3.4%	2.4%	1.7%	1.5%	1.1%	0.7%	0.6%	0.5%	0.3%	0.2%	0.1%	23.1%
40%	0.1%	0.2%	0.3%	1.0%	4.1%	4.1%	3.0%	2.2%	1.8%	1.3%	1.1%	0.9%	0.6%	0.4%	0.3%	0.2%	0.1%	21.6%
50%	0.1%	0.2%	0.2%	0.6%	2.5%	2.7%	2.0%	1.6%	1.2%	1.2%	0.7%	0.6%	0.3%	0.2%	0.1%	0.0%	0.0%	14.4%
60%	0.0%	0.1%	0.1%	0.4%	1.6%	1.5%	1.3%	1.1%	0.8%	0.4%	0.4%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	8.1%
70%	0.0%	0.0%	0.1%	0.3%	0.9%	0.9%	0.6%	0.6%	0.3%	0.2%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	4.4%
80%	0.0%	0.0%	0.1%	0.1%	0.3%	0.3%	0.2%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.4%
90%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
100%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
TotaRC	0.7%	2.0%	2.0%	5.3%	17.4%	18.1%	13.5%	10.3%	7.9%	6.1%	4.6%	3.4%	2.3%	1.7%	1.1%	0.8%	0.5%	97.7%

FOR GENERATIONS

Note: 2.3% accounts higher than 160 kW

TOPIC #3

EXISTING LGS AND MGS RATE STRUCTURES

BG hydro & For generations

OUTLINE FOR TOPIC #3

- 1. How the LGS and MGS rates work
- 2. Evaluation reports and conservation outcomes
- 3. Customer understanding and BC Hydro administration issues
- 4. Jurisdictional assessment
- 5. Bonbright assessment of the existing LGS and MGS rate structures
- 6. High-level summary of alternative rate structure categories



LGS – EXAMPLE 1:

CONSUMPTION HIGHER THAN BASELINE, BEYOND PRICE LIMIT BAND (PLB) ACTUAL KWH AND HBL >14,800 KWH





LGS – EXAMPLE 2:

CONSUMPTION LOWER THAN BASELINE, BEYOND PLB, ACTUAL KWH AND HBL >14,800 KWH





MGS – EXAMPLE 1:

CONSUMPTION HIGHER THAN BASELINE, BEYOND PLB, ACTUAL KWH AND HBL >14,800 KWH



BChydro

MGS – EXAMPLE 2:

CONSUMPTION LOWER THAN BASELINE, BEYOND PLB, ACTUAL KWH AND HBL >14,800 KWH



Monthly Consumption (kWh)



MGS – EXAMPLE 3:

CONSUMPTION LOWER THAN BASELINE, BEYOND PLB, ACTUAL KWH AND HBL <14,800 KWH



Monthly Consumption (kWh)



LGS: NET CHARGES AND CREDITS AT LRMC

80% of customers have net annual LRMC charges or credits within +/-15% of total bill







 Note: Results can be volatile. If there are major changes in the economy these proportions can swing

LGS: BILLING DISTRIBUTION, ENERGY COMPONENT OF THE RATE (F2014)



LGS Energy Tarif	f, F2014
Part 1 T1	9.61 c/kWh
Part 1 T2	4.62 c/kWh
Part 2 LRMC	9.56 c/kWh



Effe	ctive rate = Energy component of bill/kWh consumed
Dep	ends on:
	Consumption at Part 1 T1 and T2 energy rates
	Consumption at Part 2 LRMC rate (credit/charge)
	Minimum Energy Charge
HOW THE MGS RATE WORKS (TOPIC #3)



Annual Consumption Range for the middle 50% of MGS

MGS Energy Tariff, F2014	
Part 1 T1	8.85 c/kWh
Part 1 T2	5.49 c/kWh
Part 2 LRMC	9.56 c/kWh



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SUMMARY OF LGS/MGS ISSUES

LGS/MGS rates not performing as expected:

1. Limited Conservation

- Confirmed by two evaluation reports
- Most recent report (F2014) found:
 - No statistically significant conservation from MGS rate at both 85% and 90% confidence levels, versus forecast of about 100 GWh/year
 - LGS evaluated savings in F2014 were 77 GWh/year at 85% confidence level and 0 GWh/year at 90% confidence level, versus forecast of about 800 GWh/year

2. Complexity

- Customers have difficulty understanding the rate structures
- Complex rate structures make budgeting/estimating savings difficult for customers
- Perceived as inhibiting growth
- Significant operational challenges for BC Hydro administratively difficult, complicated billing process



2012-2013 AND F2014 EVALUATION OBJECTIVES

- 1. Assess customer awareness, understanding and acceptance of LGS and MGS rate structures
- 2. Understand customer response to these rates
- Assess effectiveness of LGS and MGS control groups for evaluation of energy savings
- 4. Estimate energy and peak demand savings attributable to LGS and MGS
- 5. Conduct large customer impact analysis (added for F2014 evaluation purposes)



EVALUATION OVERSIGHT

- BC Hydro oversight across multiple business units
- Evaluation process included two third party review categories:
 - 1. First category consisted of review by two third parties with industry expertise
 - 2. Second category consisted of additional third party review given variance between forecasted conservation savings and evaluated results
 - Energy savings evaluation method was reviewed by an evaluation expert from Christensen Associates Energy Consulting, who also reproduced the energy savings estimates for 2011 and 2012



2012 – 2013 EVALUATION REPORT: KEY FINDINGS

Evaluated Energy Savings

- LGS: 144 GWh/year (2011) and 200 GWh/year (2012)
- MGS: No statistically significant savings (9 months only)
- Control groups are of value for evaluation purposes
- Unaided awareness of the LGS and MGS rate structures was low



F2014 EVALUATION REPORT: METHODS AND DATA FOR CUSTOMER AWARENESS, UNDERSTANDING, ACCEPTANCE AND RESPONSE

- Online customer surveys in 2012 and 2014
 - 2014 survey had 288 respondents
 - 2012 survey had 421 respondents
- Interviews with seven Key Account Managers (KAMs) representing hundreds of LGS and MGS accounts
- Four, 90 minute customer focus groups made up of 18 LGS and MGS customers



UNAIDED AWARENESS OF RATE STRUCTURE

Rate Class	2012 Survey		2014 survey	
	Time on rate	% of respondents correctly identifying	Time on rate	% of respondents correctly identifying
LGS customers	1.5 years	33%	3.5 years	35%
Larger MGS customers	0.5 years	20%	2 years	26%
Smaller MGS customer	NA	NA	1 year	22%

Observation:

 The proportion of LGS and MGS customers who were able to correctly identify their rate structure is lower than found for other BC Hydro rates (Residential Inclining Block (RIB) – 50%; TSR – 83%)



REPORTED UNDERSTANDING FOLLOWING A WRITTEN DESCRIPTION AND ILLUSTRATION



LOW DEMONSTRATED UNDERSTANDING

- Focus group research indicated that few customers were able to demonstrate a practical understanding of application of the rates
- Even after a video and moderator explanation, focus group participants continued to demonstrate key gaps in understanding of the rates
- Confusion on baseline and value of Part 2 charge/credit
- KAMs reported that while most customers understood the intent of the rates, few people within an organization understood mechanics of how they worked



COMMENTS ON THE RATE

• Following information that the intent of the rates was to promote conservation, many survey respondents expressed support for it

Somewhat or strongly support		
LGS	Larger MGS	Smaller MGS
47%	44%	46%

- Focus group participants were not supportive of how the rates work:
 - Tier 1 threshold of 14,800 kWh is arbitrary
 - Part 2 energy charge is unfair
 - Adding infrastructure always results in adverse bill impact
- Customers with consistent moderate growth did not support the rates. Growth was enough to incur energy bill charges but not large enough to trigger an exemption
- Administrative burden for customers with a single BC Hydro bill covering multiple tenants, due to difficulties determining how to fairly apportion costs to tenants



FOR GENERATIONS

EFFORT PUT INTO MINIMIZING ENERGY CHARGES



PRICE SIGNAL TO WHICH CUSTOMERS RESPOND

Focus group participants reported that they mainly looked at the total bill amount

• KAM interviews revealed that some Key Account customers were responding to the Part 2 credit/charge and not just to total bill

Customers prefer Power Smart program incentives as a more direct motivator of conservation



EFFECTIVENESS OF THE CONTROL GROUP

- In 2010 400 accounts were assigned to control group status, 200 to MGS and 200 to LGS
- This allowed for the use of Randomized Control Trial (RCT) method to estimate energy savings
- RCT is widely considered strongest research method
- RCT requires control groups that are similar to treatment groups in all respects aside from treatment
- The control groups were found to be valid and effective, and were used to estimate energy savings from LGS and MGS rates



ENERGY SAVINGS RESULTS





CONCLUSIONS

- Multiple lines of evidence indicate that the customer conservation response to the LGS and MGS rates was considerably less than forecast
- Evaluated net energy savings in F2014 were 77 GWh per year, or 8% of forecasted savings (zero energy savings for MGS accounts in every year evaluated)
- Unaided awareness and demonstrated understanding of the rates was low
- Analysis of 12 Key Account customers, who would be expected to be responsive to the LGS rate, did not detect a statistically significant response to introduction of LGS rate



OUTLINE: CUSTOMER AND ADMINISTRATIVE ISSUES

1. Customer Understanding

- Customers cannot forecast energy costs
- 2. Customer Acceptance Unintended Consequences

3. Implementation Practicality

- Customer commentary
- Billing issues



RIB ENERGY CHARGE EXPLANATION

Customer X consumed 1,800 kWh from Oct 15 to Dec 14, 2014

Step1 22.1918 kWh X 61 Days X \$0.0752 = \$115.34 Step2 (1,800-1,354) kWh X \$0.1127 = \$50.26

Total Energy charge:

\$165.60



CUSTOMER AND ADMINISTRATIVE ISSUES (TOPIC #3) LGS ENERGY CHARGE EXPLANATION

Customer X consumed 95,000 kWh from Oct 15 to Nov 14, 2014

Retrieve 3 year history				
	Year	9/15-10/14	10/15-11/14	11/15-12/14
	2011	100,000	105,000	110,000
	2012	95,000	100,000	105,000
	2013	90,000	95,000	100,000

Calculate monthly baselines

2011

9/15-10/14 Daily Average: 100,000/30 days = 3,333 10/15-11/14 Daily Average: 105,000/31 days = 3,387 11/15-12/14 Daily Average: 110,000/30 days = 3,667 **2012**

9/15-10/14 Daily Average: 95,000/30 days = 3,167 10/15-11/14 Daily Average: 100,000/31 days = 3,226 11/15-12/14 Daily Average: 105,000/30 days = 3,500 **2013**

9/15-10/14 Daily Average: 90,000/30 days = 3,000 10/15-11/14 Daily Average: 95,000/31 days = 3,065 11/15-12/14 Daily Average: 100,000/30 days = 3,333 **2014 Baselines**

2011 Prorated Oct: (3,333X14)+(3,387X17) = 104,2472012 Prorated Oct: (3,167X14)+(3,226X17) = 99,1722013 Prorated Oct: (3,000X14)+(3,065X17) = 94,0972014 Oct Baseline = (104,247+99,172+94,097)/3 = 99,1722011 Prorated Nov: (3,387X14)+(3,667X16) = 106,0862012 Prorated Nov: (3,226X14)+(3,500X16) = 101,1612013 Prorated Nov: (3,065X14)+(3,333X16) = 96,2372014 Nov Baseline = (106,086+101,161+96,237)/3 = 101,161

Calculate billing baseline

Average Oct Daily Baseline: 99,172/31 days = 3,199Average Nov Daily Baseline: 101,161/30 days = 3,2632014 Oct 15 - Nov 14 billing baseline3,199X16 days + 3,263X14 days = 96,871

4	Calculate Part 1 Charge (baseline)
	Tier1 14,800 kWhX \$0.1010 = \$1,494.80Tier2 (96,871-14,800) kWh X \$0.0486 = \$3,988.67Total Part 1: \$1,494.80 + \$3,988.67 = \$5,483.47
5	Calculate Part 2 Charge (credit/charge)
	Difference between consumption and baseline: 95,000 – 96,871 = (-1,871) Credit LRMC Range: 96,871 X (-20%) = (-19,374) (-1,871 < -19,374)
	LRMC Credit: (-1,871 X \$0.0971) = \$181.70 CR Tier 1 Credit: 0 X \$0.1010 = \$0 Tier 2 Credit: 0 X \$0.0486 = \$0
	Total Part 2 Credits: \$181.70 + \$0 + \$0 = \$181.70 CR
6	Calculate Two-Part Energy Charge
	Part 1 = \$5,483.47 Part 2 = \$ 181.70 CR Total: \$5,483.47 + \$181.70 CR = \$5,301.76
7	Calculate Minimum Energy Charge
	95,000 kWh X \$0.0311 = \$2,954.50 Total: \$2,954.50
8	Calculate Monthly Minimum Charge
	Peak Winter Demand = 300 kW Step 1 = $35 \text{ kW X } \$0 = \0 Step 2 = $115 \text{ kW X } \$5.19 = \$ 596.85$ Step 3 = $150 \text{ kW X } \$9.95 = \$1,492.5$
9	Total Energy Charge
	Two-Part>Minimum Energy Charge>Monthly Minimum Charge \$5,301.76 > \$2,954.50 > \$2,089.35 Total: \$5 301 76

CUSTOMER UNDERSTANDING

LGS vs. MGS – Two similar but different rates



Observation:

 Customers with both LGS and MGS accounts are more confused



CUSTOMER ENGAGEMENT AND COMMUNICATION

2010	 LGS Rate Design & Implementation Customer research and engagement LGS system configuration LGS customer communication & education
2011	 LGS Launch & MGS Preparation Leverage LGS learning Customer research and engagement MGS system configuration
2012	 MGS Group 1 Launch MGS customer communication and education Rates web pages redesign LGS TS 82 interpretation
2013	 MGS Group 2 Launch Leverage LGS and MGS Group 1 experience MGS Group 2 customer communication and education
2014	 Rate Operations Review the LGS/MGS rates Address gaps Fix billing bugs

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CUSTOMERS CANNOT FORECAST ENERGY COSTS

Online Tool or complicated spreadsheets are needed to forecast electricity costs

Values generated: March 20, 2013 15:59

	2012		2013	:	2014
Enter Overall Change from Prior Year:			-5.0 %		-5.0 %
Enter Energy Usage by Month:	Forecast (kVVh)*	Baseline (kVVh)	Forecast (kVVh)*	Baseline (kVVh)	Forecast (kVVh)*
January	101,254	115,009	96,191	104,651	91,381
February	86,546	100,502	82,219	91,654	78,108
March	83,524	99,918	79,348	92,056	75,381
April	64,907	77,426	61,662	71,470	58,579
Мау	50,259	62,215	47,748	54,848	45,359
June	39,858	49,552	37,865	42,021	35,972
July	35,456	45,931	33,683	37,448	31,999
August	28,366	41,439	26,948	30,760	25,601
September	35,922	46,857	34,128	38,714	32,420
October	62,632	68,246	59,500	61,588	56,525
November	90,687	94,300	86,153	89,176	81,845
December	105,643	110,785	100,361	103,882	95,343
Total Annual Energy Use (kVVh)	785,054	912,180	745,802	816,266	708,513
Net Change From Prior Year (including all edits)			-5.00%		-5.00%
Load Factor ^b	51%		51 %		51 %
Estimated Annual Cost ^c	\$49,009		\$47,242		\$50,773

Information needed for energy budgeting:

- ✓ Three year consumption history
- Current consumption
- ✓ Future consumption
- ✓ Baseline adjustment rules

	Past usag	e by calendar mor	nth (kWh)	Baselines (kWh)
	2012	2013	2014	2015
Jan	101,254	108,173	105,920	105,116
Feb	86,546	92,490	96,229	91,755
Mar	83,524	81,391	88,091	84,335
Apr	64,907	55,469	57,644	59,340
Мау	50,259	49,488	31,581	43,776
Jun	39,858	28,964	23,510	30,778
Jul	35,456	26,068	24,225	28,583
Aug	28,366	26,428	25,472	26,755
Sep	35,922	32,777	33,958	34,219
Oct	65,463	55,815	-	-
Nov	81,341	84,910	-	-
Dec	106,181	110,450	-	-
Total	779,077	752,423	486,630	504,657

"WHAT'S THE BLENDED LGS (MGS) RATE?"





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Consumption

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UNINTENDED CONSEQUENCES

Baseline adjustment provisions

 Adjusting baselines higher through the Formulaic Growth Rule results in higher bills 50% of the time



• Future bills are unpredictable due to multiple variables involved in billing – past, current and future consumption



CUSTOMER ACCEPTANCE ISSUES

Growth

- The rates are characterized by customers as barriers to growth
- Customers requested special baseline treatment for:
 - Past and future expansions and business growth
 - Growth that does not meet the baseline adjustment thresholds
 - Phased development projects

New Accounts

- Customers are subject to the 15% LRMC charge when transferring account ownership with no operational change:
 - Asset acquisition
 - Change in ownership



ADMINISTRATION ISSUES

Operational challenges in implementation and administration

- Calculating current energy charge based on baseline complicates billing process
 - Complete and accurate data is critical for the two-part rates
- Exception Management is complicated and time consuming

Examples

- TS 82 billing
- Back dated move in and move out
- Billing corrections
- Property management account transfers
- Meter consolidation and separation
- Complex bill calculation requires complex billing controls
- Customers have difficulty understanding the rates which adds to administrative effort



JURISDICTIONAL ASSESSMENT

- Energy + Environmental Economics surveyed GS rates of 10 Canadian and 25 U.S. utilities as part of 2009 LGS Application (123 rate schedules in total); Canadian component updated by BC Hydro
 - Winter peaking jurisdictions (FortisBC, SaskPower, Manitoba Hydro, Hydro Quebec, New Brunswick Power, Nova Scotia Power, Avista, Seattle City Light) and summer peaking (Toronto Hydro, California utilities)
 - Regulated, vertically-integrated as well as utilities that have been deregulated with wholesale competition and retail access (Ontario, Vermont, New York)
 - Predominantly hydro generation and predominantly thermal generation



CANADIAN JURISDICTIONAL ASSESSMENT

• Default GS energy charges

- BC Hydro the only Canadian utility with a default baseline rate for GS customers
- Most common is a flat or declining energy charge
- Inclining block energy charges for GS customers are uncommon all are in Ontario; a low threshold of 750 kWh/month implemented under government direction in 2004 and a current differential between tier 1 and tier 2 rates of about 1.5 cents per kWh
 - The inclining block charges under the Ontario Regulated Price Plan are being phased out as mandatory TOU rates continue to be implemented (90% of Residential and GS now under TOU rates)
- Default GS demand charges
 - BC Hydro is only Canadian utility with 3 tier inclining block demand charge
 - Most common is a flat demand charge, including those structures that do not charge for an initial small block of demand



FOR GENERATIONS

CANADIAN JURISDICTIONAL REVIEW (2014) – GS

Canadian Utility	GS Category	Energy Charge	Demand Charge
SaskPower	All GS classes	Declining Block (2 Tier)	Flat (No charge for a small first block)
Manitoba Hydro	All GS classes	Declining Block (3 Tier)	Flat (No charge for a small first block)
Hydro Quebec	All GS classes	Declining Block (2 Tier)	Flat (No charge for a small first block)
Ontario utilities	All GS classes	Inclining Block (2 Tier)	Flat
Nova Scotia Power	Small (<45,000 kWh/year)	Declining Block (2 Tier)	n/a
	Medium (>32,000 kWh/year)	Declining Block (2 Tier)	Flat
	Large (>1,800 kW)	Flat	Flat
Newfoundland Power	All GS classes	Declining Block (2 Tier)	Seasonal (higher rates in 4 winter mo.)
New Brunswick Power	All GS classes	Declining Block (2 Tier)	Flat (No charge for a small first block)
Yukon Electric	All GS classes	Inclining (3) – Declining (1) (4 Tier)	Flat
FortisBC	Small (<40 kW)	Flat	n/a
	General (40-500 kW)	Declining Block (2 Tier)	Flat (No charge for a small first block)
BC Hydro	LGS & MGS	Baseline Rate	Inclining Block

2009 Survey (LGS Rate Application)

- 7 inclining block energy charges (Ontario utilities) of 29 rates surveyed in Canada
- 1 inclining block energy charge of 94 GS rates surveyed in the U.S.



LGS AND MGS BONBRIGHT CRITERIA & ASSESSMENT

Criteria (1961 Text)	Assessment
Economic Efficiency Price signals that encourage efficient use and discourage inefficient use (1)	 The Status Quo (SQ) 2-part baseline rates are theoretically economically efficient rates intended to deliver energy conservation by exposing customers to an energy LRMC price signal The LGS/MGS rates are not delivering substantial conservation
Fairness Fair apportionment of costs among customers (2); Avoid undue discrimination (3)	 No cost of service basis for the inclining demand charge
Practicality Customer understanding and acceptance, practical and cost effective to implement (4); Freedom from controversies as to proper interpretation (5)	 Complex rates difficult for customers to understand difficult for BC Hydro to administer The energy and demand rate structures are atypical (jurisdictional assessment)
Stability Recovery of the revenue requirement (6); revenue stability (7); rate stability (8)	The rates are effective in collecting the revenue requirement



THREE BROAD APPROACHES

Three broad approaches to LGS/MGS energy rate alternatives:

- 1. Baseline Rate
 - SQ
 - Simplification (Flatten Part 1 Energy; Part 2 Energy Adjustments)
- 2. Inclining block energy rate (like RIB, no baseline)
- **3**. Flat energy rate (no baseline)
- Alternatives to address other issues, such as growth rules or the treatment of new accounts, are dependent upon whether baseline rates continue in some form





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SGS CHARACTERISTICS

- About 170,000 accounts
- About 4,000 GWh consumption in F2014

SGS Accounts Consumption

Distribution





SGS SITE TYPE MEDIAN CONSUMPTION



Observation:





SGS

No apparent strong basis to depart from current SQ design

- No apparent reason to implement a stepped energy rate
 - Flat energy rate beyond the upper range of energy LRMC
 - No criteria or means on which to develop a one-size fits all threshold between a Step 1 and Step 2 rate (heterogeneous customers)
- Meters serving SGS do not display a demand reading
 - Per Measurement Canada requirements, customers should be able to see registration reading used for billing at meter
- Most Canadian utilities do not bill smaller GS customers separately for demand



TOPIC #5

VOLUNTARY TOU FOR GS CUSTOMERS

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COMMERCIAL VOLUNTARY TOU

Possible benefit:

- Customer Increased choice in rates
- BC Hydro shifting consumption from heavy load hours to light load hours

Major concerns:

- Poorly timed in the face of a pressing need to reduce the complexity in the default LGS/MGS rates 1.
- 2. Participation mainly from those with beneficial load shapes leading to cost shifting within the classes
- 3. Low peak to off-peak price differential given capacity need (8+ hour)
- Significant increase in complexity 4.

Observations:

- Uncommon design in Canada for GS classes ۲
- Ontario Auditor General found that mandatory TOU in Ontario delivering no energy and very little ۲ capacity savings, due in particular to low peak/off-peak price differentials (1.8x-3x peak to off-peak price differentials)
- BC Hydro 2000-2001 LGS Voluntary TOU Pricing Pilot very small change in peak and off-peak usage (1.3% decrease and 1.5% increase, respectively)(2x - 3x peak to off-peak price differentials) BChydro FOR GENERATIONS
NEXT STEPS

- 1. LGS/MGS/SGS Workshop 1: Session 2 Alternative Rate Structures Feb. 11, 2015
- 2. Written comment period will begin at the posting of the Session 2 workshop notes
- **3**. BC Hydro consideration memo April 2015
- 4. LGS/MGS/SGS Workshop 2 is planned for May 26, 2015



THANK YOU

SEND COMMENTS TO:

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Web: www.bchydro.com/about/planning_regulatory/2015-rate-design.html

Find BC Hydro at:





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