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MSA Report

Residential Load Profiles

28 April, 2004

Market Surveillance Administrator

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1 BACKGROUND

In the province of Alberta, customers are billed for their electricity consumption which is measured by either an interval meter or a cumulative meter. Interval meter customers are billed based on their actual consumption in any given hour. Cumulative meter customers are billed for their consumption based on infrequent meter readings ranging in frequency from monthly to once every six months. As the distribution of each customer's consumption between meter reads is not measured, it is assumed through the use of a load profile.

Almost all residential customers in the province have cumulative meters and are therefore billed based on a load profile. Residential load profiles differ depending on which settlement zone a customer lives in. In Alberta, residential customers are billed based on two different types of load profiles. Customers in ENMAX's Calgary service area and in the ATCO service area are billed based on a residential load profile[1]. Customers in the remainder of the province are billed based on the Net System Load Shape (NSLS)[2] for their service area. Note that each residential and NSLS profile is different and is calculated based on actual consumption within a settlement zone.

One day it is likely that residential customers who have not chosen to sign up for a long-term electricity contract will pay for their electricity consumption based on a Pool price flow-through rate. The purpose of this exercise was to determine the effect of load profiling and location on these customer's bills and to assess the effect of Pool price volatility on the variability of their monthly electricity bills based on an assumed monthly electricity consumption. Note that the analysis is not intended to mimic actual events. It is purely theoretical and results should be considered directional in nature rather than absolute.

2 DATA COLLECTION AND ASSUMPTIONS

Load profiles for residential customers were collected from the four Load Settlement Agents (LSAs)/Wire Service Providers (WSPs) in the province for six different zones, as follows:

- ENMAX - Calgary (residential profile)
- ENMAX – Lethbridge (NSLS profile)
- ENMAX – Red Deer (NSLS profile)
- EPCOR – Edmonton (NSLS profile)
- ATCO – Fort McMurray (residential profile)[3]
- Aquila – Rocky Mountain House (NSLS profile)[3]

Note that each of the WSPs serves locations other than those identified above. These six municipalities were chosen to be representative of various locations across the province.

[1] Residential load profiles are calculated based actual measured consumption from a number of interval meters at sample sites which are assumed to be representative of residential consumption in that area.

[2] NSLS is calculated based on total metered consumption in a service area minus the sum of all known consumption (interval meters + deemed consumption + other profiled consumption + unaccounted for energy (UFE)). NSLS is essentially what is left over after all the known consumption has been accounted for.

[3] Note that ATCO and Aquila only have one service area each. A specific location within each service area had to be selected in order to properly calculate some charges on representative bills in these territories.

The data was collected in the form of Settlement Profile Information (SPI) files, as defined in section B.6.2.3 of the Settlement System Code. All SPI files used were those issued for final settlement (rather than initial, monthly or interim settlement).

For this exercise it was assumed that each theoretical customer consumed exactly 600 kWh of electricity in each month and the consumption was distributed equally over each of the days in that month[4]. Daily consumption was then distributed amongst the 24 hours in the day based on the load profile for the service area. It was also assumed that each customer was on a Pool price flow-through rate for electricity. Pool prices for 2002 and 2003 were used for the simulation.

3 ANALYSIS AND RESULTS

3.1 Load Profiles

Load profiles were collected for the six service areas noted above for the 2002-2003 period and the average profile for the entire period (730 days) was calculated. Average profiles are plotted in **Figure 1**. As noted above, specific profiles for residential customers are calculated for the ENMAX Calgary service area and the ATCO service area. All other residential customers are billed based on the NSLS for their service area. The shape of the profiles is actually quite different, as shown in the figure.

The two residential profiles are quite similar with a morning peak around HE08 and an evening peak around HE18-HE20 with a slight drop off in consumption between HE10 and HE16. The NSLS profiles have a more prolonged morning ramp up and are somewhat higher during the mid-day hours. They also have a slightly muted evening peak compared to the residential profiles. The difference in shape of the two types of profiles can primarily be attributed to the types of customers included in each profile. For example, the NSLS profile would likely contain a lot of small commercial (office buildings, shopping malls, etc…) load as well as residential load. The operating hours of these facilities account for the elevated consumption during the mid-day hours in comparison to the residential profile.

Note that the load profile in each zone is different for every day of the period. Profiles can actually change quite a lot from day to day and season to season as shown in **Figure 2** which plots the actual daily residential profiles for the ENMAX – Calgary service area for a typical winter day and a typical summer day in the period. The seasonality of the profiles can clearly been seen in the figure.

[4] For example, for the month of January, the customer consumed 600 kWh total which equals 19.35 kWh per day. In a shorter month like February, daily consumption would increase to 21.43 kWh to reach the total of 600 kWh for the month.

Figure 1 - Comparison of Average Load Profiles for Residential Customers

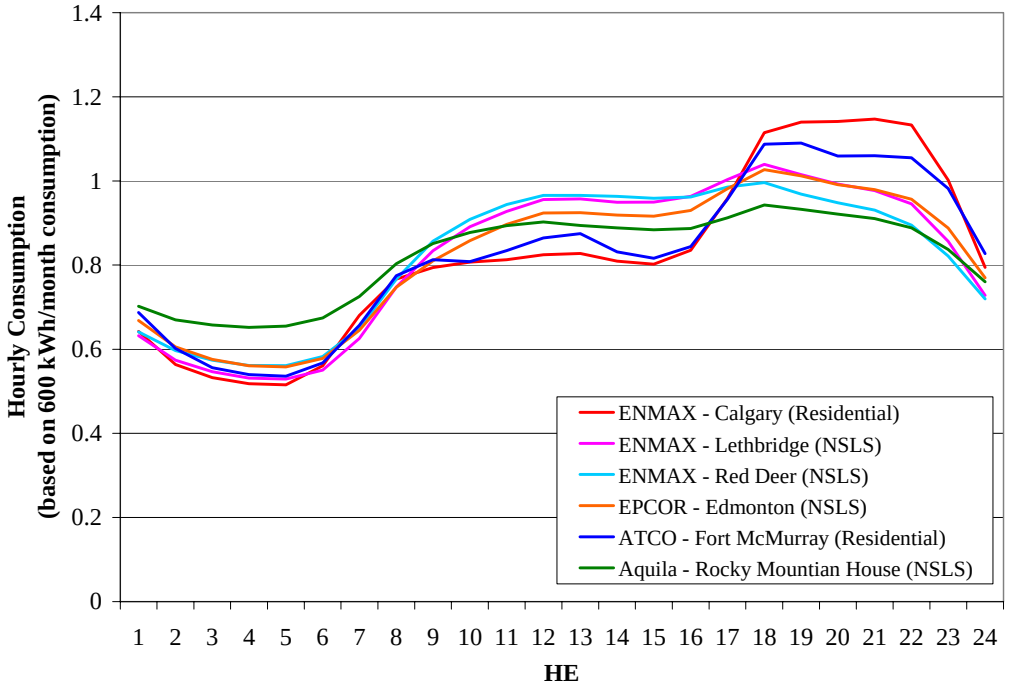
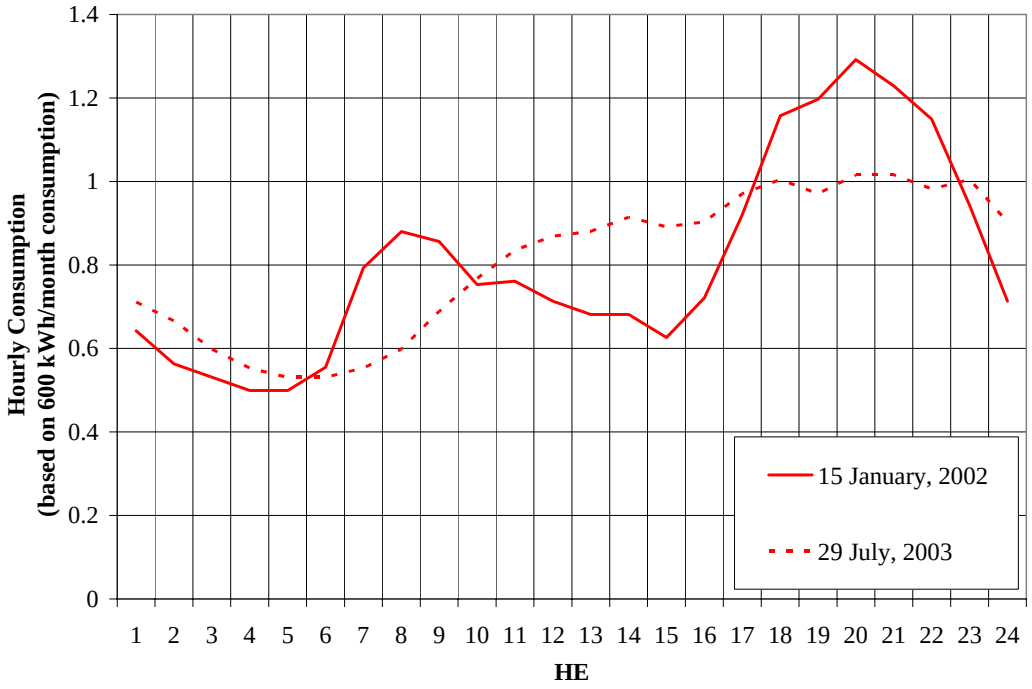


Figure 2 - Comparison of ENMAX Calgary Residential Load Profiles



3.2 Calculation of Monthly Electricity Bills

The calculation of monthly electricity bills was split into two components: energy charges and other charges. The impact of each type of charge on the bottom line of the monthly electricity bill is discussed in the following sections.

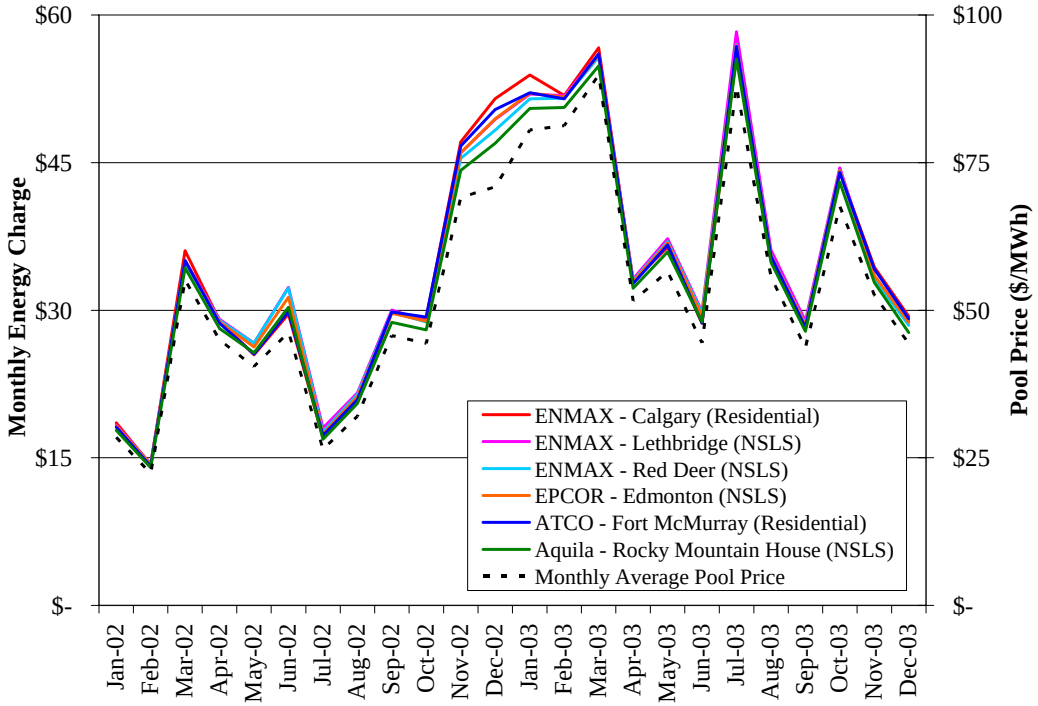
3.2.1 Calculation of Monthly Energy Charges

Monthly energy charges were calculated for the six service areas examined based on 600 kWh/month consumption and 2002-2003 Pool price flow-through rates. The results of the calculation are tabulated in **Table 1**. **Figure 3** plots the monthly energy charges along with monthly average Pool price.

Table 1 – Monthly Energy Charges

	ENMAX			EPCOR	ATCO	Aquila
Month	**Calgary Residential**	**Lethbridge NSLS**	**Red Deer NSLS**	**Edmonton NSLS**	**Fort McMurray Residential**	**Rocky Mountain House NSLS**
Jan-02	$18.54	$18.32	$18.18	$18.23	$18.11	$17.80
Feb-02	$14.30	$14.41	$14.34	$14.33	$14.16	$13.99
Mar-02	$36.05	$35.06	$34.83	$35.02	$35.06	$34.28
Apr-02	$28.91	$29.08	$28.94	$28.82	$28.66	$28.13
May-02	$25.46	$26.66	$26.66	$26.27	$25.54	$25.67
Jun-02	$29.60	$32.33	$32.27	$31.32	$29.85	$30.30
Jul-02	$17.04	$18.03	$17.63	$17.43	$17.27	$16.89
Aug-02	$20.64	$21.60	$21.43	$21.20	$20.91	$20.51
Sep-02	$29.75	$30.01	$29.81	$29.69	$29.82	$28.76
Oct-02	$29.22	$28.89	$28.79	$28.88	$29.30	$27.99
Nov-02	$47.09	$46.01	$45.42	$45.99	$46.67	$44.22
Dec-02	$51.50	$49.39	$48.28	$49.46	$50.40	$46.97
2002 Total	**$348.11**	**$349.77**	**$346.60**	**$346.64**	**$345.74**	**$335.52**
2002 Average	**$29.01**	**$29.15**	**$28.88**	**$28.89**	**$28.81**	**$27.96**
Jan-03	$53.90	$51.97	$51.47	$52.05	$52.10	$50.51
Feb-03	$51.81	$51.80	$51.54	$51.66	$51.47	$50.60
Mar-03	$56.66	$56.00	$55.73	$55.91	$56.04	$54.84
Apr-03	$32.93	$33.17	$33.00	$32.90	$32.69	$32.23
May-03	$36.40	$37.27	$36.98	$36.85	$36.64	$35.93
Jun-03	$28.66	$29.87	$29.72	$29.43	$28.68	$28.80
Jul-03	$55.97	$58.30	$57.01	$56.89	$56.79	$55.50
Aug-03	$35.15	$36.10	$35.59	$35.52	$35.46	$34.86
Sep-03	$28.13	$28.91	$28.57	$28.48	$28.24	$27.84
Oct-03	$44.06	$44.46	$44.19	$44.16	$43.99	$43.02
Nov-03	$34.36	$33.46	$33.17	$33.52	$34.18	$32.80
Dec-03	$29.37	$28.84	$28.48	$28.76	$29.11	$27.71
2003 Total	**$487.40**	**$490.17**	**$485.44**	**$486.15**	**$485.39**	**$474.64**
2003 Average	**$40.62**	**$40.85**	**$40.45**	**$40.51**	**$40.45**	**$39.55**

Figure 3 - Monthly Energy Charge Comparison



The figure shows that (as one might expect) energy charges track Pool price very closely. However, there is definitely some variation in the monthly energy charges that is a result of the profile being applied. For example, although on an annual total basis (for both years) customers in the ENMAX – Lethbridge service area would have paid the highest energy charge, the energy charge in November 2002 through March 2003 is clearly higher in the ENMAX – Calgary service area than in any other of the service areas. Conversely, while the lowest energy charge is in the Aquila service area for the majority of the two year period, during May and June 2002 the lowest energy charge is in the ENMAX – Calgary service area. The average difference between the highest monthly energy charge and the lowest monthly energy charge is only $1.65/month. The monthly energy charges are not clearly higher or lower in any given service area than in another.

As the energy charges are highly dependent on Pool price, there is a corresponding degree of volatility in the monthly values. Monthly energy charges range from a low of $13.99 (February 2002, Aquila) to a high of $58.30 (July 2003, ENMAX – Lethbridge). Volatility in monthly energy charges (as measured by the coefficient of variation) for the entire 2002-2003 period was 0.35 for all of the service areas profiled on NSLS and was slightly higher at 0.36 for the two service areas with residential profiles. When examined on an annual basis, volatility averaged 0.38 in 2002 and 0.27 in 2003. (Monthly average Pool price volatility measured 0.35 in 2002 and 0.28 in 2003.) In general, energy charge volatility (based on Pool price flow-through) is not highly dependent on they type of profile (residential or NSLS) used in the service area.

Comparison to Pool Price

A comparison of what residential customers would have paid annually for their electricity and annual average Pool price was made by calculating profile-weighted Pool prices for the six service areas. **Table 2** shows the profile-weighted average Pool price for each of the service areas for 2002 and 2003 and compares it to the annual average Pool price. The table shows that on average, residential customers on a Pool price flow-through rate would have paid approximately 7% more than average Pool price for electricity. This again shows the effect of the profiling and indicates that residential customers generally consume more energy in higher priced hours than in lower priced hours.

Table 2 - Profile-Weighted Average Pool Prices

Service Area	Profile-Weighted Average Pool Price ($/MWh)	
	2002 (Average = $43.93/MWh)	2003 (Average = $63.99/MWh)
ENMAX – Calgary	48.35	67.69
ENMAX – Lethbridge	48.58	68.08
ENMAX – Red Deer	48.14	67.41
EPCOR – Edmonton	48.14	67.52
ATCO – Fort McMurray	48.02	67.41
Aquila – Rocky Mountain House	46.60	65.91
Average	47.97	67.34
% of Pool Price paid by Residential Customers	109%	105%

Comparison of Pool Price Flow-Through and RRO

The difference in energy charges using a Pool price flow-through and the 2003[5] regulated rate option (RRO) was also studied. Total annual energy charges for 2003 (based on 600 kWh/month consumption) were calculated for Pool price flow-through and RRO and compared. Results are shown in **Table 3** along with the 2003 RRO rates. (Note that residential customers in the ATCO service area were moved to a Pool price flow-through RRO in April 2003 and therefore this comparison was not conducted for the ATCO territory.)

[5] RRO as in place in December 2003.

Table 3 - 2003 RRO Rates and Annual Energy Charge Comparison

Service Area	2003 RRO (c/kWh)	Total Annual Energy Charge		Difference (F-T – RRO)
		Flow-Through	RRO	
ENMAX – Calgary	5.482	$487.40	$394.70	$92.70
ENMAX – Lethbridge	5.985	$490.17	$430.92	$59.25
ENMAX – Red Deer	6.348	$485.44	$457.05	$28.39
EPCOR – Edmonton	5.960	$486.15	$429.12	$57.03
Aquila – Rocky Mountain House	6.179	$474.64	$444.89	$29.75

The table shows that customers on RRO would have fared better in 2003 than customers on Pool price flow-through in each of the service areas. This indicates that in the time period studied it would have been very hard for a competitive retailer to compete with the RRO. Note that with an average Pool price of $62.99/MWh in 2003; assuming RRO providers bought their energy in the spot market they would have had to pay more to procure the energy than they could sell the energy for in all service areas.

Note that when the RRO is fixed for a period of time it takes into account known and expected influences on the price of electricity. If, for example, gas prices are unexpectedly high in a period, resulting in higher than expected (real-time) electricity prices, the RRO might be artificially lower than the real cost of acquisition for that period. For example, the RRO charged to ENMAX's Calgary residential customers in 2002 was 6.1c/kWh ($61.00/MWh). This RRO would have resulted in an annual energy charge of $439.20 based on 600 kWh/month consumption. A customer on Pool price flow-through would have paid only $348.11 for energy during the same time frame. The difference in annual energy charges is -$91.09 (RRO customers would have paid more than flow-through customers). This demonstrates that RRO prices will not always be better than Pool price flow-through.

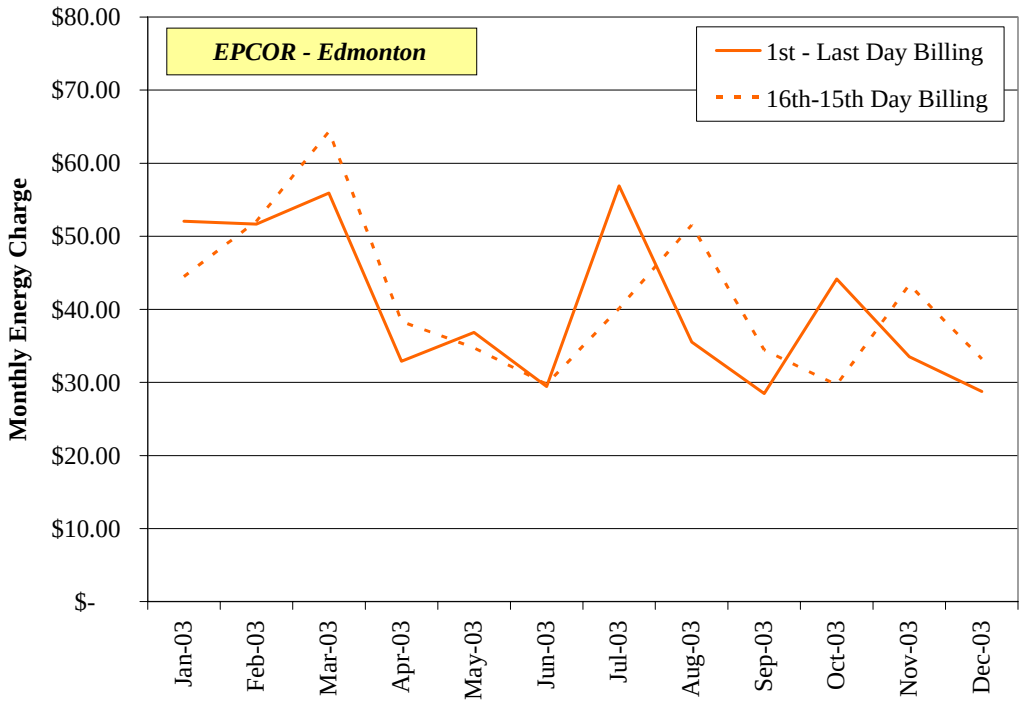
As the above analysis is based on an assumed monthly consumption of 600 kWh/month, there is no volatility in the monthly energy charge of customers on RRO. The monthly energy charge would simply be 1/12 of the annual energy charge. Volatility in monthly energy charges would be purely due to variability in consumption.

Sensitivity of the Billing Cycle

The effect of different billing cycles was examined by comparing monthly energy charges representing consumption from the first to the last day of the month with monthly energy charges representing consumption from the 16th day of the month to the 15th day of the following month. This analysis was conducted using the

same assumptions as the original analysis but only for the 2003 period[6]. Monthly energy charges for the two different billing cycles are compared in **Figure 4** for the EPCOR – Edmonton service area to illustrate an example of the differences between the billing cycles.

Figure 4 - Comparison of Monthly Energy Charges on Different Billing Cycles



The figure shows that with billing from the 16th of the month to the 15th of the month, monthly energy charges would have been slightly different on a monthly basis. However, there is very little difference in energy charge volatility between the two different billing cycles. Volatility averaged 0.27 for both billing cycles – slightly lower than the measured volatility of 2003 Pool price (0.28). The difference in the prices shown in the figure is primarily due to higher prices in the last half of December 2002 (included in January 2003 for the 16th to the 15th billing cycle) compared to the last half of December 2003 (included in December 2003 for the first of the month to the last of the month billing cycle). This effect can be seen in the figure as there are the same numbers of spikes in each series but the timing of the spikes is sometimes offset depending on when during the month the higher prices occurred.

On a cumulative basis, the customer who was billed at the end of the month paid a total of $486.15 for their electricity. The customer who was billed on the 15th of the month paid a total of $496.05 for their electricity. The difference of less than $10.00/year is due to the higher prices which occurred in the last half of

[6] The January 2003 bill is based on consumption from December 16th 2002 through January 15th 2003.

December 2002 (included in the total for the customer who was billed on the 15th of the month) relative to prices which occurred in the last half of December 2003 (included in the total for the customer who was billed at the end of the month).

3.2.2 Other Charges

To simulate the total monthly bill to the customer, data on system access, distribution, billing, franchise/local access fees and administration fees (other charges) was also gathered. The transmission tariffs in effect in each of the service areas in December 2003 were used to approximate these charges for the entire 2002-2003 period. Note that no rate riders or taxes were added to the bottom line of the bill.

Table 4 shows the values used in the calculation of other charges for each of the six service areas examined as well as the typical charge that would be added to the energy component of a bill for a month with 31 days and a monthly consumption of 600 kWh.

Table 4 - System Access, Distribution, Billing, Franchise and Administration Fees

		ENMAX			EPCOR	ATCO	Aquila
		Calgary Residential	Lethbridge NSLS	Red Deer NSLS	Edmonton NSLS	Fort McMurray Residential	Rocky Mountain House NSLS
System Access	$/kWh	$ 0.0029	$ 0.0038	$ 0.0031	$ 0.0081	$ 0.0093	$ 0.0072
	$/day	$ 0.1000	$ 0.1138	$ 0.0816			
Distribution	$/month				$ 9.1100	$ 21.0600	$ 12.0000
	$/day	$ 0.1968	$ 0.3287	$ 0.3077			
	$/kWh	$ 0.0118	$ 0.0077	$ 0.0092	$ 0.0010	$ 0.0369	$ 0.0124
Billing	$/month				$ 1.0600	$ 1.8400	$ 4.0600
	$/day	$ 0.1841	$ 0.0756	$ 0.1006			
Franchise Fee	$/kWh				$ 0.0037		
	% of dist. Charges	11.10%	31.00%	17.00%		7.60%	2.90%
Admin. Fee[7]	% of SA and D						3.75%
Monthly Charge (31 days)		**$ 25.72**	**$ 29.35**	**$ 25.87**	**$ 17.88**	**$ 54.33**	**$ 29.41**

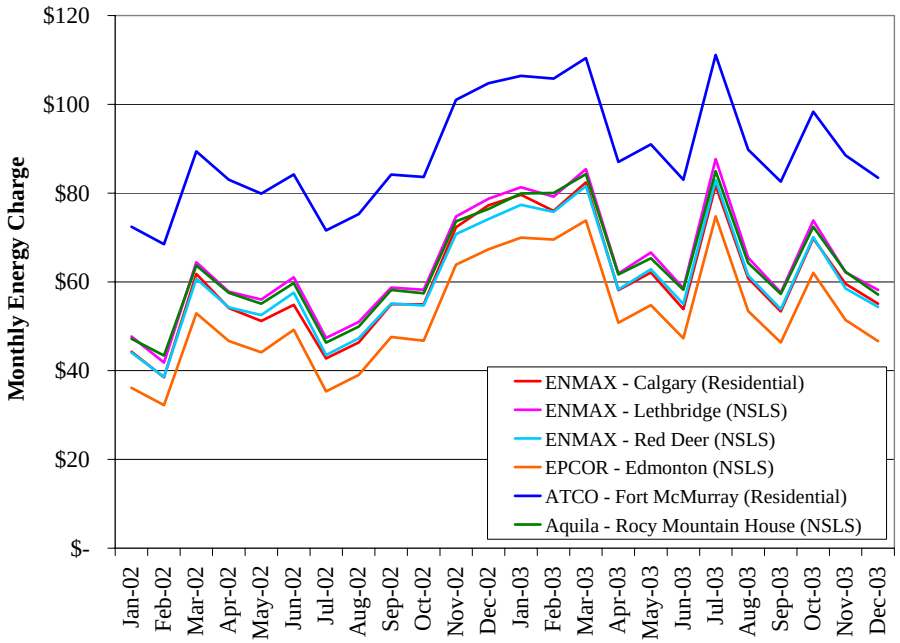
Note the large difference in these charges between the six service areas. Costs range from $17.88/month in the EPCOR – Edmonton service area to $54.33/month in the ATCO – Fort McMurray service area. Other charges in the four other service areas studied are not as diverse and are clustered in the $25 - $30/month range. Once again, this comparison should be considered direction in nature. In reality, the non-energy components of electricity bills are derived from a combination of government policies and EUB decisions on rate schedules and tariffs – the timing of which may vary between different service areas.

[7] EPCOR has been contracted to oversee billing in the Aquila service area. An administration fee of 3.75% of System Access and Distribution charges is applied to each customer's bill to cover the cost incurred by EPCOR.

3.2.3 Total Monthly Billing

Monthly total electricity bills were then calculated for each of the six service areas for each of the 24 months in the 2002-2003 period. Billing was based on actual calendar months (the bill would represent consumption from the first day of the month to the last day of the month). **Table 5** lists the monthly and annual energy charges, other charges and total bill amount for each month for the six areas examined. **Figure 5** plots the total monthly bill amounts.

Figure 5 - Total Monthly Bill Comparison



The table and figure show that electricity bills were the highest for the ATCO service area and the lowest in the EPCOR-Edmonton service area for each month in the entire period. The average difference between the total monthly ATCO and EPCOR bills for the entire two year period was $36.68/month. Bills for the four other service areas studied were more closely clustered between the ATCO and EPCOR extremes.

The comparison of the energy charges and the total bill amounts clearly shows that it is in fact the other charges and not the energy charge component of the bill that have a larger impact on the total amount of the monthly electricity bill.

Table 5 - Comparison of Monthly Electricity Bills

Month	ENMAX									EPCOR			ATCO			Aquila		
	Calgary Residential			Lethbridge NSLS			Red Deer NSLS			Edmonton NSLS			Fort McMurray Residential			Rocky Mountain House NSLS		
	Energy	Other	Total	Energy	Other	Total	Energy	Other	Total	Energy	Other	Total	Energy	Other	Total	Energy	Other	Total
Jan-02	$18.54	$25.72	$44.26	$18.32	$29.35	$47.67	$18.18	$25.87	$44.06	$18.23	$17.88	$36.11	$18.11	$54.33	$72.43	$17.80	$29.41	$47.21
Feb-02	$14.30	$24.18	$38.48	$14.41	$27.39	$41.79	$14.34	$24.20	$38.54	$14.33	$17.88	$32.21	$14.16	$54.33	$68.49	$13.99	$29.41	$43.41
Mar-02	$36.05	$25.72	$61.77	$35.06	$29.35	$64.41	$34.83	$25.87	$60.70	$35.02	$17.88	$52.90	$35.06	$54.33	$89.38	$34.28	$29.41	$63.70
Apr-02	$28.91	$25.21	$54.11	$29.08	$28.70	$57.78	$28.94	$25.32	$54.26	$28.82	$17.88	$46.70	$28.66	$54.33	$82.99	$28.13	$29.41	$57.55
May-02	$25.46	$25.72	$51.18	$26.66	$29.35	$56.01	$26.66	$25.87	$52.53	$26.27	$17.88	$44.15	$25.54	$54.33	$79.87	$25.67	$29.41	$55.09
Jun-02	$29.60	$25.21	$54.81	$32.33	$28.70	$61.03	$32.27	$25.32	$57.59	$31.32	$17.88	$49.20	$29.85	$54.33	$84.18	$30.30	$29.41	$59.72
Jul-02	$17.04	$25.72	$42.77	$18.03	$29.35	$47.38	$17.63	$25.87	$43.51	$17.43	$17.88	$35.31	$17.27	$54.33	$71.60	$16.89	$29.41	$46.30
Aug-02	$20.64	$25.72	$46.36	$21.60	$29.35	$50.95	$21.43	$25.87	$47.30	$21.20	$17.88	$39.08	$20.91	$54.33	$75.24	$20.51	$29.41	$49.92
Sep-02	$29.75	$25.21	$54.96	$30.01	$28.70	$58.71	$29.81	$25.32	$55.13	$29.69	$17.88	$47.57	$29.82	$54.33	$84.14	$28.76	$29.41	$58.17
Oct-02	$29.22	$25.72	$54.94	$28.89	$29.35	$58.24	$28.79	$25.87	$54.66	$28.88	$17.88	$46.76	$29.30	$54.33	$83.63	$27.99	$29.41	$57.41
Nov-02	$47.09	$25.21	$72.30	$46.01	$28.70	$74.70	$45.42	$25.32	$70.74	$45.99	$17.88	$63.87	$46.67	$54.33	$101.00	$44.22	$29.41	$73.63
Dec-02	$51.50	$25.72	$77.22	$49.39	$29.35	$78.74	$48.28	$25.87	$74.16	$49.46	$17.88	$67.34	$50.40	$54.33	$104.73	$46.97	$29.41	$76.38
2002 Total	**$348.11**	**$305.06**	**$653.17**	**$349.77**	**$347.65**	**$697.42**	**$346.60**	**$306.58**	**$653.18**	**$346.64**	**$214.56**	**$561.20**	**$345.74**	**$651.93**	**$997.67**	**$335.52**	**$352.96**	**$688.48**
2002 Average	**$29.01**	**$25.42**	**$54.43**	**$29.15**	**$28.97**	**$58.12**	**$28.88**	**$25.55**	**$54.43**	**$28.89**	**$17.88**	**$46.77**	**$28.81**	**$54.33**	**$83.14**	**$27.96**	**$29.41**	**$57.37**
Jan-03	$53.90	$25.72	$79.62	$51.97	$29.35	$81.33	$51.47	$25.87	$77.34	$52.05	$17.88	$69.93	$52.10	$54.33	$106.42	$50.51	$29.41	$79.92
Feb-03	$51.81	$24.18	$75.99	$51.80	$27.39	$79.19	$51.54	$24.20	$75.75	$51.66	$17.88	$69.54	$51.47	$54.33	$105.80	$50.60	$29.41	$80.02
Mar-03	$56.66	$25.72	$82.38	$56.00	$29.35	$85.35	$55.73	$25.87	$81.60	$55.91	$17.88	$73.79	$56.04	$54.33	$110.37	$54.84	$29.41	$84.25
Apr-03	$32.93	$25.21	$58.14	$33.17	$28.70	$61.87	$33.00	$25.32	$58.31	$32.90	$17.88	$50.78	$32.69	$54.33	$87.01	$32.23	$29.41	$61.65
May-03	$36.40	$25.72	$62.12	$37.27	$29.35	$66.62	$36.98	$25.87	$62.85	$36.85	$17.88	$54.73	$36.64	$54.33	$90.97	$35.93	$29.41	$65.34
Jun-03	$28.66	$25.21	$53.86	$29.87	$28.70	$58.56	$29.72	$25.32	$55.03	$29.43	$17.88	$47.31	$28.68	$54.33	$83.01	$28.80	$29.41	$58.21
Jul-03	$55.97	$25.72	$81.69	$58.30	$29.35	$87.65	$57.01	$25.87	$82.88	$56.89	$17.88	$74.77	$56.79	$54.33	$111.12	$55.50	$29.41	$84.92
Aug-03	$35.15	$25.72	$60.87	$36.10	$29.35	$65.46	$35.59	$25.87	$61.46	$35.52	$17.88	$53.40	$35.46	$54.33	$89.79	$34.86	$29.41	$64.27
Sep-03	$28.13	$25.21	$53.34	$28.91	$28.70	$57.61	$28.57	$25.32	$53.88	$28.48	$17.88	$46.36	$28.24	$54.33	$82.57	$27.84	$29.41	$57.25
Oct-03	$44.06	$25.72	$69.78	$44.46	$29.35	$73.82	$44.19	$25.87	$70.06	$44.16	$17.88	$62.04	$43.99	$54.33	$98.32	$43.02	$29.41	$72.43
Nov-03	$34.36	$25.21	$59.57	$33.46	$28.70	$62.16	$33.17	$25.32	$58.49	$33.52	$17.88	$51.40	$34.18	$54.33	$88.51	$32.80	$29.41	$62.22
Dec-03	$29.37	$25.72	$55.09	$28.84	$29.35	$58.20	$28.48	$25.87	$54.35	$28.76	$17.88	$46.64	$29.11	$54.33	$83.44	$27.71	$29.41	$57.13
2003 Total	**$487.40**	**$305.06**	**$792.46**	**$490.17**	**$347.65**	**$837.82**	**$485.44**	**$306.58**	**$792.02**	**$486.15**	**$214.56**	**$700.71**	**$485.39**	**$651.93**	**$1137.32**	**$474.64**	**$352.96**	**$827.61**
2003 Average	**$40.62**	**$25.42**	**$66.04**	**$40.85**	**$28.97**	**$69.82**	**$40.45**	**$25.55**	**$66.00**	**$40.51**	**$17.88**	**$58.39**	**$40.45**	**$54.33**	**$94.78**	**$39.55**	**$29.41**	**$68.97**

4 CONCLUSIONS

The results of the foregoing analysis have clearly shown the effect of location and the variability of residential electricity bills throughout the province. The analysis shows the following:

- Differences in total monthly electricity bills for residential customers are more dependent on other (system access, distribution, etc…) charges than they are on the energy charge.
- While residential and NSLS load profiles appear quite different on an hourly basis, when the energy component for monthly billing is calculated, the differences are actually quite small. This indicates that profile type does not have a large impact on energy charges.
- Variability in monthly energy charges is highly dependent on Pool price (when energy charges are calculated using a Pool price flow-through) but does not appear to be dependent on the timing of the bill (billing cycle).
- The 2003 (residential) profile-weighted average Pool price was higher than the average Pool price for the year in each service area. This indicates that residential customers tend to consume more energy during higher priced hours.
- Customers on 2003 RRO rates paid less for the energy they consumed than customers would have on Pool price flow-through in their respective service areas. This shows that RRO rates are relatively low and are difficult for other retailers to beat. This is not necessarily the case in all years.