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September 20, 2013

Via Email
Original via Mail

Strata Corporation KAS2464
c/o Henry Stanski
#324 – 2365 Stillingfleet Road
Kelowna, B.C.
V1W 4X5

Attention: Mr. Henry Stanski

Dear Mr. Stanski:

Re: FortisBC Inc. (FBC)

Application for Approval of a Multi-Year Performance Based Ratemaking Plan for 2014 through 2018 (the Application)

Response to the Strata Corporation KAS2464 (Stanski) Information Request (IR) No. 1

On July 5, 2013, FBC filed the Application as referenced above. In accordance with Commission Order G-109-13 setting out the Preliminary Regulatory Timetable for the review of the Application, FBC respectfully submits the attached response to Stanski IR No. 1.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC INC.

Original signed:

Dennis Swanson

Attachments

cc: Commission Secretary
Registered Parties (e-mail only)

Section: Appendix E2 Load Forecast.

1a) Error: Table E2-1, the Residential HDD for December is missing; the number "172" is the missing value.
Incomplete statement: With Table E2-2, the p-value cut-off is typically 0.05, hence September is statistically significant; in addition August is very close (p-value of 0.052) to being significant. How then does Climate change affect the peak demand forecasts during the summer cooling period?

Response:

Table E2-2 (the Residential HDD value of 172 for December is missing, please refer to Errata 2) shows the statistical analysis results to assess the climate change effects with respect to HDD and CDD for energy consumption (GWh), not peak demand (MW). At a pre-selected significance level, the impact will be considered as statistically significant or not. Therefore, September is the only month with a significant result.

If we consider the climate change impact for September, then given the regression slope of -2 HDD/year and the load normalization factor of 114 MWh/HDD (combined for both the Residential and Wholesale classes), the impact would be an annual load reduction of 228 MWh or 0.2 GWh, a quite insignificant number.

1b) Comment on page 6, Paragraph 3, Appendix E2, the categorization of the various months into "Season" could be more effective by defining Winter to be November to March, followed by to transition groupings…. April and October into one group; and May and September into another. The transitional groupings have similar HDD values and could lead to better load forecasts.

Response:

The seasonal grouping in this application is based on the natural seasonal months. Load behavior in different natural seasons is expected to be different. The suggested seasonal grouping above is not natural and will cause difficulties in interpreting and applying the normalization results.

In general, there is dis-appointment with the level of science used with regard to weather influences and electrical load forecasting. "Performance" in "Performance Based Ratemaking Plan" should imply more than low level science. How is FortisBC expanding their knowledge base on customer demographics and service requirements? In particular:

2a) A thesis paper entitled "Hedging Corporate Revenues with Weather Derivatives" by Antoni Garcia and Franz Sturzenegger is an example of true science with regard using trend analysis for weather influences on electrical loads and decision thresholds. Does FortisBC intend to match the statistical and scientific applications that hedge funds use?
http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.197.273&rep=rep1&type=pdf

Response:

No. FBC's approach to forecasting is sound, robust and a prudent use of customer dollars. The method of regression of load on degree day that FBC uses to normalize loads has long been established[1] and is commonly practiced in the utility industry.

The Company studied the cited reference above and concluded that it is not a relevant reference with respect to weather normalization. This reference is a case study that addresses a totally different problem, which is hedging against low-impact and high-frequent risks of temperature variation using financial instruments (in this case they are weather derivatives namely call, put, and swap options with HDD and CDD as the underlying) for a milk and juice supplier in Europe. The reference proposes an econometric model to forecast daily temperature in order to calculate HDD and CDD for pricing the derivatives. FBC believes that daily weather forecast might be useful for very short-term load forecasting, is not useful for medium and long-term load forecasting, especially when the load forecast assumes a base weather as normal throughout the planning horizon. Lastly it would not be a prudent use of customer dollars to invest in a large number of theoretical studies with little or no benefit to the ratepayer. FBC believes that its methodology is sound and defensible. Furthermore, variances in short term forecasts flow to the deferral account to be recovered in rates in following years.

2b) Heating Degree day (HDD) and Cooling Degree Day (CDD) calculations as provided by Environment Canada follow the simple calculation of averaging the observed max and min temperatures and then subtracting the base reference temperature. To increase accuracy, the base temperature subtracted from the

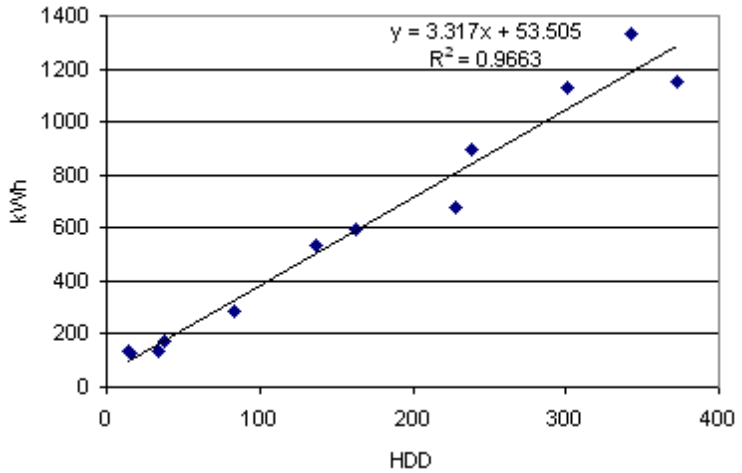
[1] http://eetd.lbl.gov/sites/all/files/energy-bldgs-degree-days.pdf

hourly observations and then summed to obtain the daily HHD of CDD. The min/max method suggests that heating/cooling is either on or off, but in reality thermostats monitor room temperatures and respond by switching heating/cooling on or off as required. This alternate method is more accurate when outside temperatures hover near the base reference temperature. Personal observation in my own neighbourhood reveals that when summer nights fail to cool below 20C by 9pm, residents tend to keep their windows closed and air conditioner working.

Response:

The HDD and CDD calculation referenced above is not entirely correct. If the daily temperature is less than the base (reference) temperature, then the daily temperature is subtracted from the base temperature to arrive at the HDD. Otherwise the HDD is set to zero. For example if the base temperature is 18^0C and the daily temperature is 10^0C then (18-10) results in a daily total of 8 HDDs. FBC then sums up the daily HDDs to create a monthly total. The CDD is calculated by subtracting the base temperature from the daily temperature when the daily temperature is greater than the base temperature, and set to zero otherwise.

FBC uses the Environment Canada definition of the daily temperature as the average of the daily maximum and minimum temperatures. This approach is accepted by the BCUC and has been in place for many years.



2c) While understanding that FortisBC is not making a scientific presentation on the methodology of load forecasting, it would be encouraging to have heard the

breath of scientific curiosity that is employed. For example, would not maximum temperatures be a better weather influence on load forecasting during the cooling season? The regression analysis between HDD and electrical consumption (see example graph) might be linear, are there are times when the slope changes? Specific examples would be to mine the data to see if when temperatures persist below -10C is there a greater load because geothermal and air source heat pumps are being supplemented by electrical furnaces and does this significantly change the slope of the consumption/HDD curve? What is the numerical value and how the balance point of a building, i.e. Outside temperature above which a building does not require heating. The internal heat gain of often assumed to be 3.5C and this would suggest that a reference base for HDD is actually 15.5C instead of 18C.

Response:

The HDD methodology used by FBC has been in place for many years and FBC is not proposing to change its methodology for this application. This application is seeking approval of a PBR mechanism for five years, the revenue requirement of which is influenced by the cost and volume of energy. The purpose of the forecast within this application is to try to get forecast energy demand as close as possible to the resulting energy demand while at the same time managing the costs of preparing the forecast: noting that any variance from forecast to actual is captured in the deferral account and either rebated to or recovered from customers the following year.

With respect to the question, weather normalization is applied to the whole FBC system, not to particular buildings. The base temperature of 18^0C is used by Environment Canada and also widely adopted by utilities across North America, including BC Hydro. The MWh/HDD slope is updated on a yearly basis.

2d) Are load calculations done for each city within the FortisBC service area or is Penticton used as the representative for the entire service area?

Response:

Penticton weather data is used as the representative for the entire service area for the weather normalization.

2e) Are the 1981-2010 Normals from Environment Canada being used?

Response:

No. FBC used the Penticton 2003-2012 averages of HDD and CDD from Environment Canada for its weather normalization.

2f) Does FortisBC have access to or contribute to any automated weather reporting stations? Has FortisBC considered/investigated the Road Weather Information system in the interior BC that reports weather observations every 20 minutes?

Response:

No. Data reports as suggested would not provide information that FBC could use in its load forecast. However, FBC is considering buying short term weather forecasts from a third party service provider for its short term load forecasting purposes. No further detail can be supplied at the moment due to confidentiality.

2g) Over the last decade or so the FortisBC 60-day invoices compare the kWh/Day for the current billing period with the previous year. Does FortisBC store and analyze this data; does the data collected show the effects of conservation initiatives?

Response:

Yes. FBC keeps this information in its Customer Information System (CIS) and uses it for load analysis purposes, and certain effects of conservation initiatives are shown in the data.

3.1 General Question: 1 Are there plans to combine the FortisBC natural gas and FortisBC electricity invoices into one combined billing?

Response:

At this time, there are no plans to combine natural gas and electricity invoices into one combined bill.

3.2 With the PowerSense rebate program, can numbers be given to show how effective this program is in conservation? Can a return on investment be calculated?

Response:

The Benefit/Cost ratio (BCR), expressed in Total Resource Cost (TRC) terms, is the mandated program "effectiveness" test required under the UCA and DSM Regulations. The TRC includes both FBC's costs (incentives plus program administration) and the Customers' portion of costs for the program measures.

As shown in attachment H-2 (FortisBC Semi-Annual DSM Report for the year ended December 31, 2012) p. 12 Table 13 lists each program, sector and overall (portfolio level) BCR for the PowerSense programs. The overall BCR_{TRC} was 1.6 which in simple terms means the Company (and its ratepayers) will save $1.60 in avoided costs (primarily power purchase costs, discounted over the life of the program measures) for every dollar jointly invested.

Another aspect that may better represent the Company's "return on investment" is the Utility Cost test (UCT) ratio shown in Appendix A of the same year-end report. The UCT is the Benefit/Cost ratio of FBC's costs (incentives plus program administration) without the Customers' portion of costs. Overall the UCT was 2.8 in 2012, which in simple terms means the Company (and its ratepayers) save $2.80 in avoided costs (again primarily a reduction in power purchases) for every dollar invested. It is noted, however, that the UCT does not consider the reduced billable load resulting from DSM, which can increase rates for non-participants even if the utility's revenue requirements is reduced overall.

3.3 It is observed the PowerSense tends to focus mainly on light bulbs, insulation and heating/cooling upgrades; i.e for the most part expensive changes. Are there plans to shift the focus towards more inexpensive changes such as awnings, snap-on-solar window shades, door drape hardware, digital programmable thermostats and LED over CFL bulbs?

Response:

To maximize persistence of savings FBC PowerSense programs tend to avoid measures that rely on user intervention such as snap-on window shades. However over the last few years FBC has given away about 30 thousand clothes lines, accompanied by prompts (dryer

magnets), and public education campaigns, to reinforce the behaviour change required to achieve clothes dryer energy savings.

Insulation and heating/cooling upgrades such as heat pumps, although more expensive, provide permanent “hard-wired” reductions in the heating and cooling loads served by the furnace and air conditioning system.

FBC has also offered rebates for programmable thermostats, with very modest customer take-up, and research has found few incremental energy savings since customers were already achieving the majority of energy savings through manual set-back.

Other measures, for instance LED light bulbs – which have seen declining costs and robust customer take-up – and will continue to be incented in the 2014-18 DSM Plan.