

MANITOBA HYDRO**2012/13 & 2013/14 ELECTRIC GENERAL RATE APPLICATION****UNDERTAKING PROVIDED BY: D. CORMIE**

Manitoba Hydro Undertaking #2

Compare the price of natural gas to the peak and off peak price of electricity for each day of the last year (from Nov 1, 2011 to Nov. 1, 2012).

Response:

Figure 1 illustrates the relationships between daily prices for natural gas at Henry Hub and MISO Day-Ahead Locational Marginal Prices at the Minnesota Hub commercial pricing node (MINN.HUB DA LMP), for periods in the summer and winter seasons.

The summer season is defined as June 1st through August 31st and the winter season is defined as December 1st through February 28th. The period of record of June 2006 through August 31st 2012 was used to sample a wider range of market price and gas price conditions. Note that the time periods are defined by Hour Ending (“HE”).

Figure 1- Average Day-Ahead Locational Marginal Price at Minnesota Hub vs. Daily Natural Gas Price at Henry Hub.

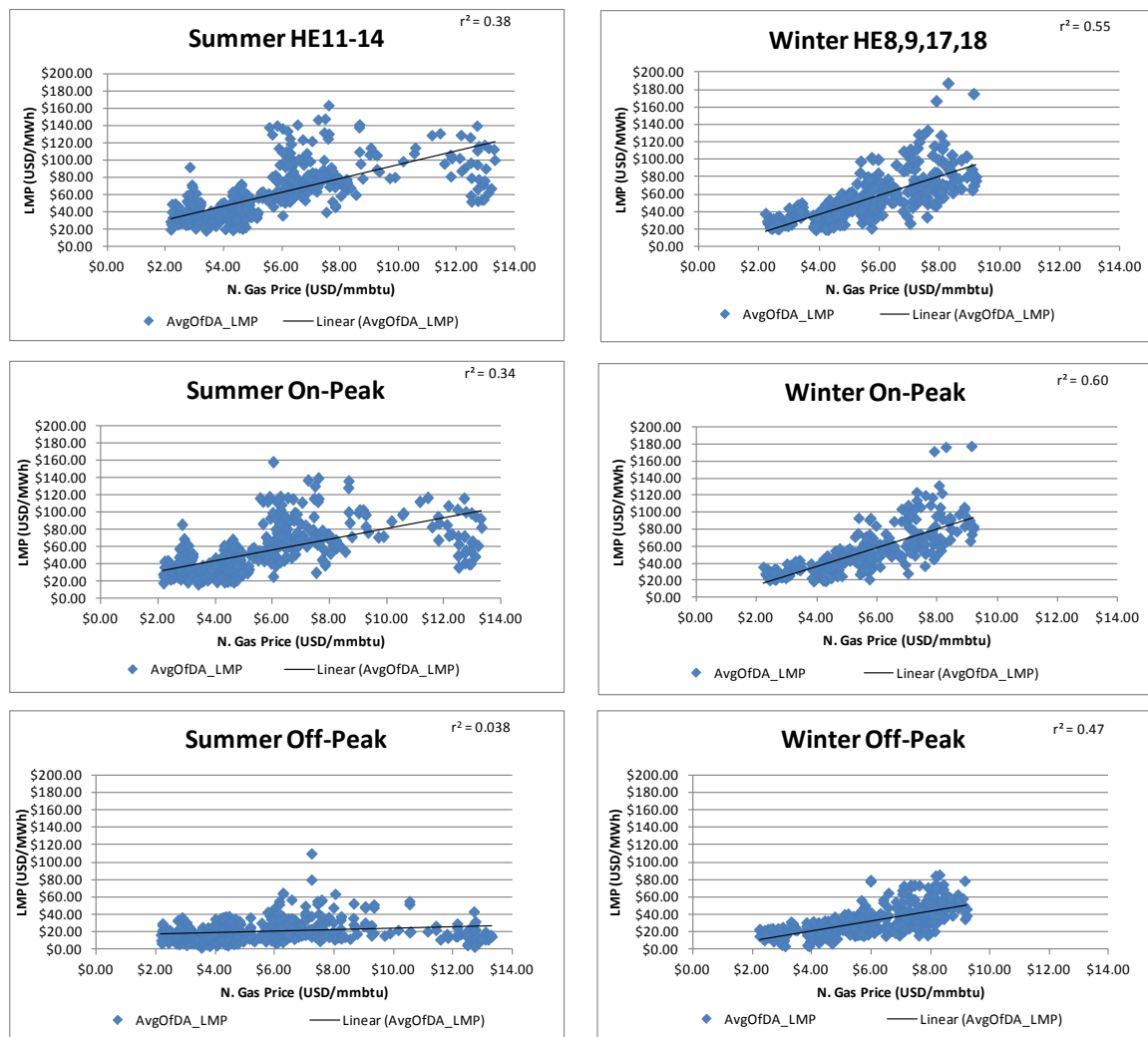


Table 1 provides statistical measures of the correlation between natural gas prices and power prices for the periods in question. The Pearson correlation coefficient (“ r ”) provided is a measure of the correlation between two variables and can take on a value between +1 and -1 inclusive. A positive coefficient indicates a positive correlation (i.e. LMP price will increase with gas price increase). The closer the coefficient is to unity, the stronger the correlation. The coefficient of determination (“ r^2 ”) statistic is also provided in Table 1. This statistic expresses the total variation in the values of the dependent variable (power price) that can be explained by a linear relationship with the explanatory variable (natural gas price). These relationships are illustrated in Figure 2.

Table 1- Pearson Correlation between Minnesota Hub Day-Ahead Locational Marginal Prices and Daily Henry Hub Natural Gas Price.

Statistic	MINN.HUB DA LMP/ HENRY HUB gas correlation					
	Summer			Winter		
	HE11-14	MISO 5x16 (HE7-22)	Off-peak	HE8-9, HE17-18	MISO 5x16 (HE7-22)	Off-peak
r	0.62	0.58	0.20	0.74	0.77	0.68
r^2	0.38	0.34	0.038	0.55	0.60	0.47